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ABSTRACT

Included in this document are the addresses and proceedings of the 41st National and 8th International Annual Conference of the American Industrial Arts Association. The proceedings are organized by the following subject groups: curriculum, drafting, electricity/electronics, elementary school industrial arts, energy/power, evaluation, futurology, graphic communications, individualized instruction, international perspective, manufacturing, metrics, miscellaneous, plastics, professionalism, public relations, publications, research, safety, special needs programs, state and local organizations, student groups, teacher education, teaching aids, teaching methods, technology, transportation, association business. (BM)

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"Preparation For Life In A Technological World"

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Addresses and Proceedings of the 41st National and 8th International Annual Conference of the American Industrial Arts Association, San Antonio, Texas, February 26-March 2, 1979.

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The American Industrial Arts Association, established in 1939, is the professional voice of industrial arts. AIAA's purpose is the development and enrichment of industrial arts as an intrinsic part of American education.

Operating as a voluntary, democratic association, AIAA is primarily concerned with the professional evolution of industrial arts curricula and personnel. Its programs for teachers, students, and supervisors are based on the premise that industrial arts is vitally significant in a world where industrial technology is critical to every aspect of our lives.

The Association works through its memebers at every level of the educational system and is an affiliate of the National Education Association. The AIAA's structure functions on three levels: national, state, and local.

As a professional association, the AIAA is responsive to its members' concerns. The membership formulates the goals of the Association in terms of individual and professional needs.

The AIAA is dedicated to the continued development of industrial arts education with programs designed specifically to prepare individuals to cope with as well as function effectively and be productive in our technological society. Industrial arts is an indispensible component of our educational system today and will continue to be so through professional unity centered on common goals. The Association in involved professionals who contribute to the educational process in a very special way.

AMERICAN INDUSTRIAL ARTS ASSOCIATION
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AIASA—American Industrial Arts Students Association as the only National Student Organization devoted exclusively to meet the needs of Industrial Arts Students at the elementary, junior high/middle school, and senior high school levels of education.

Table of Contents

Past Presidents of the American Industrial Arts Association . . . vi

AIAA and COUNCIL SPECIAL INTEREST SESSIONS BY SUBJECT GROUPS

CURRICULUM

Back to the Basics in Industrial Arts, Wayne Andrews, Franzie Loepp . . . 2
Curriculum Articulation in Michigan, George L. Baker, Chris M. Olson . . . 4
Teaching Repertoire for Developing and Implementing Individually Prescribed Competency-Based Instructions in Industrial Arts, Herbert C. Beacham . . . 6
North Dakota State Plan for Program Development in Industrial Arts from 1973-1980, Myron Bender, Ernest Breznay, Jerome Sisnewski . . . 8
Digital Electronics Experimentation in the Classroom, **(AIACSA)** James W. Fite . . . 10
Get Passive Solar into your Curriculum, C.E. Francis . . . 12
Tennessee Cluster Approach to Industrial Education, James Lorenz, Michael R. Bachler . . . 14
Curriculum Structure for Technology Education, David L. McCrory . . . 16
North Carolina Solar Energy Curriculum, W. Christopher Musselwhite . . . 18
"Parke's Adventurous Projects", Nelson L. Parke . . . 20

DRAFTING

Implementing Competency Based Curriculum Guides, John E. Bonfadini 23
Implication of Developmental Tasks and Instructional Content in Curriculum Development, Marvin I. Sarapin 25
Classroom Applications of Appropriate Technology (AT): Energy and Food Production, Robert W. Knight, Dennis M. Scanlin 27

ELECTRICITY/ELECTRONICS

Development of a Multi-Track, Multi-Entry-Point Program in Electrical and Electronics Technology, Troy F. Henson . . . 30

ELEMENTARY SCHOOL INDUSTRIAL ARTS

Implications of P. L. 94-142 for Elementary School Industrial Arts, **(ACESIA)** Clarence R. Calder, Jr. 33
Elementary Industrial Arts and Elementary Career Education, **(ACESIA)** William R. Hoots, Jr. 35

ENERGY/POWER

Automotive Energy Conservation, Steve R. Carter 38
Solar Energy Air Collectors, Marshall S. Hahn 40
Iowa Curriculum—Energy and Power, Rex W. Pershing 42
Energy Use Within the Food Production System, Edward C. Pytlik 44
Future Energy Resources, Anthony E. Schwaller 46
The Appropriate Technology Perspective Applied to Energy Education in Industrial Arts, John W. Sinn 48

EVALUATION

Standardized Testing in Industrial Arts: A National Student Exam? Michael J. Dyrenfurth 51

FUTUROLOGY

The Future of Education, Sandra Ann Angelo 54
The Future Role of Industrial Arts, Glen O. Fuglsby 56
Industrial Arts/Technology—A Strategy for Change, James Hales, James Snyder 58
Futures Workshop, **(ACIATE)** Gary Lintereur, Rex Purshing, Lee Smalley 60

GRAPHIC COMMUNICATIONS

Iowa Industrial Arts Curriculum Project, Harold Berryhill 63
Graphic Communications Curriculum Project, Ray D. Loyd 65

INDIVIDUALIZED INSTRUCTION

Computer-Managed Instructional Delivery in Industrial Arts, Edward E. Boas, Jr. 68
Production Systems: A Culminating Experience (with Adaptations for Secondary Education), David Bradley, Nathan Brubaker, Anthony Korwin, Mark Rogstad 72

Production Systems, Donald R. Darrow, Douglas T. Pine, Robert Warrington 70
Modification of Existing IMP Curricular Materials, James R. Heggen, John J. Geil 74
Individualized Welding Instruction, Hal Riddle 76

INTERNATIONAL PERSPECTIVE

Reproduction (Microfilm), Claude A. Bell 79
The People's Republic of China: Slides & Reflections on Technology, Education, and Culture, Arvon D. Byle 81
The Role of International Relations in Industrial Arts Education, David L. DePue 83
Industrial Arts in Australia, Kevin R. Morgan 84

MANUFACTURING

A Conceptualized Product Servicing Model, W. D. Umstattd . . . 87

METRICS

Metrics for Beginners, Ronald E. Jones 90
Why Metricate—Plastics Age, Terry Richardson. 91

MISCELLANEOUS

STUDENT/PROJECT/PROGRAM RELATED 93
A Motivation Method in Industrial Arts for the Improvement of Reading, John Surra, Javis Baillargeon, Herbert Siegel . 94
Operation of a Student Exhibit at a State Convention, **(ACIASAO)** Clagett Boehner 96
Standards for Industrial Arts Education Programs Project, William E. Dugger, Jr., Charles A. Pinder, E. Allen Bame . . . 98
Contemporary Practices for Glues & Adhesives, L. Duane Griffiths 100
Making Color Prints from Color Slides, Ronald E. Jones, Janet L. Robb 102
Power Mechanics in the Middle School, Don Kelly 104
The Old and New of Climate Control, Max E. Kanagy. 106
Materials Processing Technology at the University of Northern Iowa, James P. LaRue, Jim Hoeksema, John Mockler, Dave Moyer. 108
Knife Making, Marvin Henry 110
Non-Threatening Supervision, Douglas Militzok 112
Techniques of Conducting State Industrial Arts Fairs, **(ACIASAO)** James O. Parnell 114
CETA/YEDPA Legislation-Implications for Arts Programs, Gregory Petty 116
Alberta Kids Alberta Advanced Education and Manpower, Clarence H. Preitz 118
Alberta Kids The Alberta Plan Teacher Preparation, Clarence H. Preitz 120
A Report of Current AIAA Legislative Efforts Affecting Industrial Arts, **(ACIAS)** Kendall N. Starkweather. 122
Industrial Training Methods, Robert E. Wenig 124

PLASTICS

A System for Developing an Occupationally Based Industrial Arts Plastics Program, Harry L. Hess 127
The Place of Plastics in the Technological World of the Future, Michael R. Kozak 129
World of Plastics—Forum II, Gerald L. Steele 131
World of Plastics—Forum I, Gary D. Weede, Harry L. Campbell, Terry Richardson, James J. Runnalls, Phillip S. Waldrop. . . 133

PROFESSIONALISM

William Everett Warner: The Man and His Profession, David Mohan 136
Supervisor's Responsibility in Orientation of New Teachers to the Profession, Robert L. Shearer 138
Professionalism for the College Student, **(AIACSA)** Floyd B. Walgren 140

PUBLIC RELATIONS

Promoting Your Industrial Arts Program, Floyd B. Walgren 143
We Need Leaders—Be One! Jerry Streichler 145

PUBLICATIONS

Writing Journal Articles, James J. Buffer, Richard A. Swanson . 148
Newsletter Format, Merle A. Denning 150
Writing Textbooks, Stephen R. Matt 152
Newsletter Round Table, Norman C. Pendered. 154

RESEARCH

Reading in Technical Areas, William D. Paige 157
Communication Technology Competency Tasks, John M. Ritz 158
Survey of Guides for Industrial Education in the United States and Canada, Henry J. Sredl, J. Steven Everett 160
Attitudes Toward Innovative Industrial Arts Programs, John S. Vaglia 162
Energy Research: How to Get Started, James N. Yadon 164

SAFETY

OSHA in Woodworking Laboratories, Clyde "Jack" James, Jr. . 167

SPECIAL NEEDS PROGRAMS

Equipment and Facility Considerations for the Handicapped, Ray Shackelford, Richard Barella. 170
Individualizing Instruction for Handicapped, John M. Shemick. . 172

STATE AND LOCAL ORGANIZATIONS

Managing a State Association, **(ACIASAO)** Thomas R. Baldwin 175
Needs Assessment for Industrial Arts State Associations, **(ACIASAO)** John T. Fecik, John Y. Stoudt. 177
Some Selected Criteria for Organizing Statewide Industrial Arts Meetings, **(ACIASAO)** G. Eugene Martin 179

STUDENT GROUPS

Filling Another Gap, **(AIACSA)** Ronald E. Baker, Norman J. Colle . . . 182

TEACHER EDUCATION

Fostering Program Improvement Through Planned Change, M. James Bensen . . . 185
Professional Competencies for Undergraduate Industrial Arts, Marc A. Caron . . . 187
Competencies for Evaluating Industrial Arts Student Teachers, Leon L. Copeland . . . 189
Putting Purpose into the Non-Class Experiences of our Graduate Students, **(ACIATE)** Michael J. Dyrenfurth, F. Milton Miller . . . 191
Doctoral Programs in Industrial Arts Education: Their Ranking and Critical Characteristics, **(ACIATE)** Ronald L. Koble . . . 193
Teacher Preparation in Technical Education at an Urban University, Everett J. Lanik . . . 195
Technology as a Content Base for Industrial Arts Teacher Education, **(ACIATE)** Donald P. Lauda . . . 197
Industrial Arts—Teacher Corps, Lyndall L. Lundy . . . 199
Time-Shortened Industrial Education Programs, Michael J. Pierson . . . 201
Accreditation of Industrial Arts Teacher Education Programs, **(ACIATE)** W. D. Umstattd . . . 203
Curriculum Model for Technology Education: Teacher Education in Power and Energy Technology, Michael R. White . . . 205

TEACHING AIDS

Micro-Computer Applications in Industrial Arts, Robert D. Brook . . . 208
Communicating Instruction with Transparencies, W. R. Forkner . . . 210
Developing Color Slides with Ease, David K. Gore . . . 212
Producing Quickie Filmstrips, Richard Henak, Richard Barella . . . 214
Microcomputers in Education, William H. Rigby . . . 216

TEACHING METHODS

Activities for Teaching Technology in the Middle School, E. Allen Bame . . . 219
Special Interest Session Topic: Mass-Produced Solar Energy Products—Design to Fabrication, Glenn Bettis, Charles Story . . . 221
Reading, Industrial Arts, and the School Library, Roger W. Cliffe . . . 223
Learning Styles, G. Leroy Ehlers . . . 225
Pay Attention! Follow Directions! James F. Fales . . . 227
Is Project Orientation Necessary for Beginning General Shop? D. Patterson Fairchild . . . 229

Nurturing Inventiveness Within, Ann Marie Hinterberger 231
Reading Technical Material in Industrial Arts, Lillian Lemke 233
Development of Work Attitudes and Work Habits in Industrial Arts Education, Cheng C. Liu 236
Industrial Simulation, John N. Riley 238

TECHNOLOGY

Appropriate Technology: A New Approach to Development, Aminur R. Chowdhury 241
Biotechnology & Industrial Arts Program for the Study of Technology, Paul W. DeVore 243
Appropriate Technology in Energy and Housing: Content of WVU's Owner-Built Housing Workshop, Louis K. Hans . . . 245
Technology for Children-Current Implementation, **(ACESIA)** Wesley Perusek 247
The Development of People Oriented Technology, Charles A. Pinder 249
Appropriate Technology for Emerging Countries, Ronald Todd, Ray Shackelford 251
Impacts of Technology, Lee Smalley, Marie Abbey 253
Appropriate Technology in Energy and Housing: Classroom Strategies and Applications of the Owner-Built Housing Workshops, Michael Vogel 255

TRANSPORTATION

Towards an "Appropriate" Transportation Technology, Mark R. Skinner 258

ASSOCIATION BUSINESS

Teacher Recognition Program, David P. Lorms 260
House of Delegates Meeting 261
Resolutions 267
President's Report 295
Fourth General Session Speech, James E. Good 277
Committee Chairpersons 301
State Representatives 302
San Antonio Conference Planning Committee. 304

AUTHOR INDEX 305

10

CURRICULUM

AIAA SPECIAL INTEREST SESSION TH - 1:00 - 12

BACK TO THE BASICS IN INDUSTRIAL ARTS.

Wayne Andrews, Assistant Professor, and Franzie Loepp, Professor, Department of Industrial Technology, Illinois State University, Normal, Illinois.

The "Back to the Basics" movement has permeated every level of education and has engulfed virtually every region of the nation. Mass media has repeatedly reported disconcerting evidence that the nation's young people are becoming less and less proficient in reading, writing, and computational skills. This trend is being attributed to the ineffectiveness of the innovative curriculum efforts of the 1960's such as modern math and special interest language arts courses. Within this context, industrial arts educators need to reflect on the implications this movement has for their curriculum.

Implications for Industrial Arts

One problem that industrial arts faces is that the general public automatically considers reading, writing, and arithmetic to be "basic," thus excluding other types of knowledge and skill. Therefore, it becomes the industrial arts teacher's responsibility to show the ways that their curriculum is also "basic." The following suggestions are offered for consideration: 1) Industrial arts teaches very important communications skills. The symbolic language of industry, i.e. sketching, drafting, etc., is a universal communication tool that nearly all industrial arts students learn to use. Further, students increase the oral and writing vocabularies as they learn the tools, machines, processes, materials, etc., commonly used in industry. 2) Industrial arts often includes the application of computational skills as well. As students determine the sizes and costs of materials, the amount of current in a circuit, the volume of a cylinder, etc., they apply arithmetic skills, and 3) Industrial arts teaches about industry and technology. Since industry is the major economic institution within our society, it appears that an understanding of industry and technology should be considered as "basic" to those preparing to live in this society. The problem then is, "What should be considered "basic" to the understanding of industry and technology?"

Determining the Basics for Industrial Arts

The first step in determining the basics is to begin with industrial arts as a discipline. Whether industry or technology is chosen as the source of content is not so important to the determination of what is "basic." It is important, however, to begin with a general description of industrial arts. This description should then be divided and sub-divided into categories until common topics and/or skills begin to appear. For example, suppose this description of industrial arts designates manufacturing as a major division within industry. Manufacturing can then be divided into such areas as management and production; production further divided until the process of "sawing" appears. Sawing would ordinarily be considered as a "basic" in industrial arts. In the opinion of the authors it can be considered a "basic" when it is learned in the context of industry and/or technology rather than as an isolated skill that is used to make materials a given dimension. By directly associating each process to the broader definition of industrial arts which in turn describes an institution within society, the student is then learning a skill that is "basic" in society.

Secondly, the developmental stages of the students may also influence what would be considered "basic." For example, middle school students may be at the stage of rapid growth with poor small motor skill control. In this case it would not be appropriate to consider the use of a hand tool to achieve high tolerances as "basic." On the other hand, the same student may find it exciting, rewarding, and educational to learn about the production of duplicate parts through the use of a jig or fixture to help guide his/her "clumsy" actions.

Summary

As the "Back to the Basics" movement continues to impart the educational community, industrial arts teachers need to be prepared to describe the ways that industial arts can be as "basic" as the three "R's." They also need to consider the discipline of industrial arts and the developmental stages of the students when selecting the content and learning activities for their classes.

AIAA. W-9:00-15

CURRICULUM ARTICULATION IN MICHIGAN. George L. Baker, Coordinator, Competency Based Education Articulation Project, Northern Michigan University, and Chris M. Olson, Assistant Professor, MSU Resource Team, Michigan State University.

This paper is a report of the Michigan statewide effort to achieve the 1984 Program Standards of Quality requirement of the Vocational-Technical Education Services to achieve curriculum articulation between secondary and post-secondary vocational programs on a regional basis. In the state of Michigan, articulation is progressing on three separate levels: secondary pre-vocational articulation, secondary/post-secondary articulation, and two-year to four-year college articulation. Articulation, as discussed in this paper, will be confined to that segment of the state's activities involving secondary to post-secondary articulation. Articulation can be defined as an agreement between public secondary schools and colleges which will allow a student to receive credit or advanced placement at the post-secondary level for learning which was achieved at the secondary school level.

In order to aid local education agencies to achieve the 1984 Program Standards of Quality, a resource team and five pilot sites were funded over a three year period to provide consultant services, coordination, and materials necessary for articulation.

All of the articulation projects and activities use competency-based education as the basis for curriculum review and validation efforts. In addition, the articulation process is organized on a task level format which enables receipt of credit by the student for courses which interface with post-secondary institutions on less than a full course basis.

The first stage of articulation was to identify institutions at the secondary and post-secondary level which had demonstrated a pattern of student flow. Institutions which indicated an interest and promised a commitment to the goals of articulation were invited to participate in in-service awareness sessions for teachers and administrators. Following the awareness sessions, teachers were separated into occupational areas and were requested to complete a task analysis of their occupational area. They used V-TECS catalogs and other materials to select and validate appropriate tasks for their students. This task analysis was the basis for each occupation's participation in the Michigan Task Level Articulation Model. For each task, competency-based objectives and criterion referenced tests were developed to measure student achievement and to facilitate the granting of advanced placement and credit at the post-secondary. A Student Achievement Recording Process, (a type of progress chart), was developed so that public school teachers could indicate the level of performance of each student in each occupational area. This record of achievement, referred to as a SARP, became a part of the student's permanent record and was transferred at the student's request to a post-secondary institution where the student wished to continue his/her education. The task lists, the tests, and the Student Achievement Recording Process were included in the manual and distributed to the teachers in each occupational area at the secondary and post-secondary level. This manual became the standard for articulation.

At the same time the curriculum analysis and materials development activities were proceeding, institutional representatives met to determine procedures by which students might take advantage of the articulated curriculum. The result was written agreements containing policy, procedures, amount of credit, circumstances under which advanced placement might be assigned, and cost if any to the student.

The original intent of the articulation process was to encourage the flow of secondary students to the post-secondary institutions while reflecting prior learning in the placement of the student in the post-secondary curriculum. By doing this, it was hoped that duplication or redundant educational programming would be eliminated or minimized thus saving time and money for students, teachers, and institutions. Because students are only now beginning to flow from the secondary to the post-secondary, it may be years before quantitative data is collected which will indicate the extent to which articulation has achieved the objectives.

While statistically unproven, the outcomes of articulation look very promising and there are implications of many positive, unforeseen outcomes. Student motivation appears to be enhanced as are the processes of career goal identification and self-concept development. An additional benefit to students who do not intend to articulate to a post-secondary institution is the availability of the SARP which provides a record of achievement with which to sell their skills to future employers.

An important outcome basic to the Project was curriculum development through task level review and validation, the development of the objective referenced tests, and the dissemination of materials usable in the classroom by teachers and students. These materials made visible the goals and means to performance for both students and teachers. There was a marked improvement in instruction as teachers became more objective oriented. Students became more aware of the specific performance levels necessary for acceptable achievement.

As the Articulation Project unfolded, one thing became very evident; the Project displayed a strong potential for professional development. This aspect was capitalized upon when secondary and post-secondary teachers were brought together to review and develop curriculum materials. The result was an interagency interfaculty cooperation and communication which did not exist previously. Teachers and administrators quickly recognized that the benefactors of articulation would be the institutions, the faculty, and most importantly the students.

Information and materials concerning the articulation process in Michigan may be acquired by writing to Dr. Ed Cory, Professional Development Unit, Vocational-Technical Education Services, Box 30009, Lansing, MI 48909.

AIAA T-9:00-18

TEACHING REPERTOIRE FOR DEVELOPING AND IMPLEMENTING INDIVIDUALLY PRESCRIBED COMPETENCY-BASED INSTRUCTIONS IN INDUSTRIAL ARTS.

Herbert C. Beacham, Professor, Department of Industrial Education,
Florida A and M University, Tallahassee, Florida

Individually prescribed competency-based instruction in industrial arts is a systematically planned and organized program of instruction with objectives that identify, in rigorous detail, the specific competencies or performances that each student is required to demonstrate after having participated in the learning activities. The prescription for the individual is based upon a realistic assessment of his/her needs.

The need for instruction to be individually prescribed is justified by the "open-door" school policy, the federal "mainstreaming" policy, the "open-entry/open-exit" provisions of competency-based instruction, and characteristics and unique needs of each student.

Plans for developing individually prescribed competency-based instruction begin with the teacher's assessment of the student's deficiencies, strengths, needs, and other characteristics. Some of the well-known techniques and resources for gathering personal information about students include tests, inventories, observation, interviews, school records, work samples, and self-assessment. The use of these techniques and resources will reveal that students differ, among other ways, in their styles or ways of learning, rates of learning, and retention of learning. School counselors, psychologists, and other professionals can provide assistance to the teacher.

After the teacher has obtained sufficient personal information about each student, he/she can then individually prescribe the kind of instruction that is necessary to meet the unique needs of each student. Before instructions can be prescribed, however, the resourceful teacher's repertoire must include a huge reservoir of instructional resources and experiences. The key to individually prescribed competency-based instruction is variation. Variation is required in the: (1) nature of the learning experiences, (2) levels of difficulty, (3) sequence of instruction, (4) amount of time, (5) use of instructional methods, techniques, and media, and (6) assessment and evaluation techniques.

Variation in the nature of the learning experiences calls for different kinds of concrete "hands-on" experiences and different kinds of activities that will help students develop required related information skills. The levels of difficulty can be varied with instructions that call for performances that range from those that are fairly simple to those that are complex. Variation in the sequence of instruction requires altering and arranging the instructional content so that every student is not required to go through and participate in the same sequence of instruction. Depending upon the competencies they already possess, they can enter at various points, master the instruction, and exit or move on as soon as possible. Variation in the amount of time allowed for learning to occur, ideally, should be as much as necessary for the student to master the performances required by the objectives. The rate at which new instructions are introduced should fit the student's own best self rate.

The selection and use of methods, techniques, and media cannot be done randomly or haphazardly. The teacher's planning must be systematic, well thought out, and must take into account considerations of the nature of the tasks to be performed, fundamental principles of learning, the human senses or channels of learning, how retention of learning can be increased, and the unique needs and characteristics of each learner. The teaching repertoire of the professionally trained and competent industrial arts instructor contains a huge reservoir of teaching methods, techniques, and media. At his/her disposal are a variety of methods for teaching manual and informational skills, such as demonstration, explanation, audio-visual presentation, instruction sheets, questioning, illustrated lecture, discussion or conference, printed instruction, programmed instruction, directed study, and experiment. Also included in the teacher's repertoire should be choices for media such as chalkboard, pictures, charts, diagrams, mock-ups, models, real objects, samples of tools and parts, projection materials and devices, audio materials and devices, tapes, and television. The teacher must choose methods, techniques, and media that are appropriate for the kind of instructions that are to be presented. The industrial arts teacher must also recognize, understand, and be alert to the human sensory channels through which learning impressions will be received, and ensure that the methods, techniques, and media to be chosen will make the best use of the channels through which learning will occur.

Included among the instructor's teaching repertoire must be strategies for managing individually prescribed instruction. Among others, these should include strategies for pacing the rate of speed at which new instructions are introduced to the student, class instruction, large and small group instructions, teacher, peer, and volunteer tutoring, and self-tutoring. Providing individually prescribed instruction does not always require that the instructor teach each student individually in a one-to-one physical relationship. Nor does it require that each student, at all times, receive separate instructions apart from a group or a class of students. Prescribed instructions are individualized when the student is provided a variety of options for learning, and is permitted to progress at his/her own best self-rate toward the achievement of his/her goal. The teacher has the liberty to permit the student to participate and receive instruction individually, within a group, or as part of an entire class. The responsibility of the teacher is to utilize and make whatever adjustments and alterations, in teaching methods, managerial strategies, and resources, that are needed to help the individual reach mastery of the competencies that he or she needs to develop.

The teaching repertoire must also contain a variety of pre- and post-assessment and evaluation techniques that include manual performance tests, written performance tests, and oral performance tests. The assessment techniques should be diverse enough to verify mastery of all of the competencies required by the performance objectives, and accommodate the needs of all students, including those who are handicapped visually or by their inability to read well.

AIAA. T-3:00-4:30 p.m.

NORTH DAKOTA STATE PLAN FOR PROGRAM DEVELOPMENT IN INDUSTRIAL ARTS FROM 1973-1980. Myron Bender, Associate Professor and Chairman, Department of Industrial Technology, University of North Dakota, Grand Forks; Ernest Breznay, North Dakota State Industrial Arts Supervisor, Bismarck, North Dakota, and Jerome Wisnewski, Industrial Arts Instructor, Lidgerwood High School, Lidgerwood, North Dakota.

Educational systems must continually change to meet the needs of every individual in preparing them for a rapidly changing world. The curricula needs to be critically reviewed in light of present cultural needs, global pressures, and technological innovations. What are needed are curricula designed not as collections of independent bits of knowledge, not as isolated and static subjects learned in a vacuum, but curricula which reflect the complex interrelationships and processes inherent in the many problems facing society. (1:3).

Another aspect of change relating to curricula is the effect change has on increasing obsolescence. In a rapidly changing world, the curriculum must be flexible; it must be constantly changed and augmented; and it must prepare the learner for change. Consequently, the curriculum must be updated and integrated with methods which will maximize learning. Instructional materials should be empirically designed, behaviorally oriented, current, intensive, and relevant to the learner's environment.

During the past six years, industrial arts educators in North Dakota have initiated a state-wide model to cope with the problem of change and obsolescence. The plan was initiated through the North Dakota Industrial Arts Association in the Fall of 1973. A special task force committee was appointed to assess the present conditions and needs with specific recommendations as to how these needs might be met. The committee identified a need for change in both the curriculum structure and in the method for administrating the industrial arts programs on a state-wide basis. The first positive outcome of this effort was the appointment of a State Supervisor of Industrial Arts in 1974. This position became the key factor toward the coordination of all other state-wide activities to improve the industrial arts instructional programs.

The Task Force Committee's recommendation to change the curriculum structure required more than appointing a state supervisor because of the nature of change and the number of people affected. After the need for change had been identified, it was concluded that the process necessary for producing educational change would include three distinct elements to make the plan operational: (1) acceptance of need to change; (2) development of instructional materials; and (3) providing inservice education.

Acceptance of Need to Change: Recognition was given to the fact that many industrial arts practices in North Dakota's public school system needed change. Support for this was drawn from the needs assessment position paper prepared by the special task force committee. A leadership conference was held to prepare a cadre of teachers that would assume a leadership role. Since there was an identifiable group of professionals who were interested and committed to the need for improvement, it was necessary to provide them with the necessary competencies to become actively involved in the change process. The participants were exposed to and provided an opportunity to interact with national leaders on curriculum trends in industrial arts. They later conducted regional workshops for other classroom teachers to obtain a "multiplier effect" on the need to change. This process allowed an exchange of ideas between teachers and administrators with the objective of establishing communication channels and developing capabilities in common technique. The general assumption was that all teachers involved in implementing a revised curriculum had to be convinced that a change was needed. Once the need was accepted, it was necessary to provide opportunity for subsequent facilitation of the process.

Development of Instructional Materials: If change is to take place in an educational enterprise, direction must be provided to those responsible to implement this change. To accomplish this task, a State Master Plan Committee was formed. The committee was charged with the responsibility of establishing parameters for the developmental change process. Among other things, the state curriculum structure was developed using the thematic cluster approach. The areas for Level I (Junior High) included: (1) Insights into Industry and Technology; (2) Graphic Communications; (3) Manufacturing; (4) Construction; and (5) Energy/Power. This approach to curriculum structuring emphasizes integrating rather than fragmentizing the total industrial arts curriculum. The uniqueness of this type of structure is that it provides an external framework with provisions for internal flexibility necessary in a dynamic enterprise, and, thereby, is adaptable to change to avoid obsolescence.

The Master Plan phase was followed with a series of inservice projects designed to provide classroom teachers with the essential competencies to prepare classroom instructional materials. This phase included the identification of subject matter, organization of subject matter, specifications of educational objectives, and identification of student competencies. The participants were then selected for the actual preparation of a Level I Curriculum Guide.

The instructional materials developed were field tested, evaluated and revised prior to the final printing of the State Industrial Arts Curriculum Guide. The Level II (Senior High) curriculum guide is currently being developed employing basically the same procedure that had been used to develop the Level I guide. It is anticipated that the Level II Guide will be completed for implementation by 1980. The general overall assumption was that well-prepared instructional materials are most essential for the implementation of new programs and to facilitate change and teacher confidence.

Inservice Teacher Education: Even after everyone is convinced that change should occur, it cannot take place until the teacher has the knowledge and ability to provide the new instruction. Inservice education must accompany state plans calling for the implementation of new courses and content. This need was met through a series of improvement of instruction seminars that have been and are being conducted at strategic locations throughout the state. The major purpose for the seminars is to provide actual hands-on activities incorporated in the new state guide for each of the four technical cluster areas. They also serve as a feedback mechanism for possible revisions in both activities and methodologies suggested in the original curriculum guide.

A developmental model facilitates the implementation of new programs and aids in systematically improving curricular offerings on a statewide basis. The model employed in North Dakota did not evolve from a vacuum but was based upon similar curriculum efforts conducted in other states during the past ten years. The model could not be operational without the cooperation and commitment of many dedicated industrial arts teachers in the State of North Dakota.

FOOTNOTES

1. Burns, R.W. and Brooks, G.D. Curriculum Design in a Changing Society. Englewood Cliffs, NJ: Educational Technology Publications, 1970.

AIACSA. TH-3:00-11

DIGITAL ELECTRONICS EXPERIMENTATION IN THE CLASSROOM.

James W. Fite, senior, Industrial Arts Education, East Texas State University, Commerce, Texas.

An exploration of any broad field, such as electronics, promises the greatest benefit when focused on a limited domain and accompanied by an awareness of "state-of-the-art" technology. Narrowing the scope of investigation facillitates early "hands-on" training, and concentrating on modern developments increases the relevance of such training. Digital electronics provides no unique exception to this idea. The now familiar "third generation" of integrated circuits was literally spawned by the earlier generations of vacuum tubes and transistors. Furthermore, with incredible advances in large-scale-integration taking place daily, the heir apparent to integrated circuits may already be coming into its own. Undoubtedly, only a few young people have both the intellectual capacity as well as the inclination for training or careers in such a highly sophisticated field. The majority, however, still need to know all they can about the world in which they will live and work. They all will own and operate equipment which uses integrated circuitry and digital logic. Computers will obviously affect their lives. Fortunately, a number of versatile, "designer" type instruments are readily available and inexpensive. With such equipment, even non-technical students can perform practical and worthwhile experiments with digital electronics and computer logic.

Digital logic, along with Boolean algebra and binary arithmetic, interrelates so closely as to become almost inseparable. Digital logic provides the basis for actual circuit applications. Boolean algebra, in turn, provides the discipline, and binary arithmetic provides the two-state language so well suited for computers. An examination of these theoretical "building blocks" will establish a base from which to proceed with a series of experiments involving three basic logic elements.

A brief review of numbering systems in general and our own familiar decimal system in particular makes it very easy to grasp the simplicity of binary arithmetic. In the decimal, or base ten, system, the digits 0 through 9 are assigned weighted positions representing different powers of ten. The rightmost position, or 10^0, complies with accepted laws of mathematics and represents unity, or ones. The next position takes the value of 10^1, or the base itself, tens. The 10^2 position represents hundreds; 10^3 stands for thousands, and so forth. A number such as 5342 illustrates this process known as expanded notation. Summing the individual valued positions produces the whole: 2 + 40 + 300 + 5000 = 5342.

The procedure works identically with the binary, or base two, system. Again, the rightmost position, 2^0, represents units, or ones. The next position, 2^1, represents twos; 2^2 stands for fours, and 2^3 indicates eights. To illustrate, the number 1110 in binary means: 0 ones, 1 two, 1 four, and 1 eight. Summing the parts as before produces : 0 + 2 + 4 + 8 = 14. Four such digits can thus be used to count in binary from zero to fifteen. An inexpensive SN 7490 integrated circuit can be employed to demonstrate this process graphically. A series of input pulses can be counted, converted, and displayed as a binary result with an array of ligh-emitting-diodes (LED's) Increasing the frequency of a "clock" input confirms the single, most important advantage that computers have over their human counterparts - speed.

The three simplest logic circuits were developed according to certain principles of Boolean algebra. The OR gate, for instance, duplicates the operation of Boolean addition. With it, any number of a set of inputs may be positive in order for the output to be positive. Secondly, the AND gate duplicates the operation of Boolean multiplication. In this case, all inputs must be positive in order for the output to be positive. The third operation is that of inversion. The NOT circuit, or Inverter, produces a positive output only when the input is negative. Conversely, when the input goes positive, the output will become negative.

All three of these operations may be demonstrated with integrated circuits (IC's) which are simply multiples of OR gates, AND gates, and Inverters. Moreover, these are generally obtained as Dual- In-Line-Package (DIP) IC's. Many can be purchased for less than fifty cents each.

The particular "designer" instrument selected by this writer to conduct logic experiments is the DD-1 Digi-Designer, produced in kit form by E & L Instruments, of Derby, Connecticut. Several other similar instuments are also available, and no endorsement of any of them is either offered or implied. The Digi-Designer uses a versatile, solderless breadboarding socket for mounting and interfacing IC's. The unit also includes a regulated power supply, a six-function clock generator, four logic switches, two manual pulsers, and four LED lamp monitors. The range of experiments which can be conducted with such an instrument is almost unlimited.

In conclusion, the wide application of integrated circuits does, unquestionably, represent a high point of human endeavor and accomplishment. Even these sophisticated devices can be studied in terms of simple, basic, logic elements. Considering, then, the availability of suitable, low-cost equipment, digital experimentation seems both practical and worthwhile, even for non-technical students.

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2. Tocci, Ronald J., Digital Systems: Principles and Applications, Englewood Cliffs: Prentice-Hall, 1977.

AIAA. TU-10:45

GET PASSIVE SOLAR INTO YOUR CURRICULUM. C. E. Francis, Associate Professor, Department of Industrial Technology, Illinois State University, Normal, Illinois.

For industrial education, passive solar is an ideal topic for addition to the curriculum. Passive solar will compliment existing programs and courses and in many cases only minor or moderate changes will be required. Passive solar course content contributes well to the major functions of the industrial arts curriculum. These functions include the interpretation of technology and industry, the exploratory function, the preparatory/prevocational function, the technical competence function and the supplementary or general education function. Of these functions, the supplementary function will probably be the most prevalent. Passive solar will be found to be of great interest to large numbers of students who are primarily interested in conservation, ecology, and national energy supplies. In addition, many students preparing for careers in the construction industry will find instruction in passive solar very appealing.

Some of the goals for passive solar would include the following:

1. Contribute to the major functions of the industrial arts curriculum.
2. Provide interesting, up to date and useful content at the secondary and post secondary levels.
3. Promote interest in industrial studies.
4. Contribute to national goals of energy independence.
5. Contribute to state goals of energy conservation.
6. Promote appropriate technology (AT).

Several advantages of integrating passive solar into the curriculum have been identified. These advantages include:

1. It is easy to get started. Initially, some aspects of passive solar can be included in architectural drafting or building construction courses, or simply as a unit in a survey course.
2. Passive solar instruction can be very inexpensive since no specialized tools or equipment are necessary. However, a meter for measuring and recording insolation and a recording thermometer would be nice to have.
3. There is an abundance of learning activities possible. Instructional materials and learning activities are easily developed by the instructor.
4. Students will get totally involved and develop high interest.

Some of the many possible learning activities for passive solar are listed below:

1. Record and publicize weather data including insolation, degree days and wind speed and direction.
2. Lay out and build a solar scope.
3. Survey building sites for passive solar. Use the solar scope to plot the skyline.
4. Build a passive test cell and then test it.
5. Build and test a thermosiphoning water heater.
6. Build and test moveable insulation such as Beadwall R and Skylids R.
7. Design a passive solar home. Draw plans and elevations, calculate glazings and thermal mass.
8. Build scale model of a passive solar home.
9. Test insulation materials and thermal storage materials.
10. Build an attached solar greenhouse.
11. Set glazings
12. Build and test a passive cooker/oven.

Many other learning activities are possible and should be selected according to course objectives, level of instruction, time availibility resources and student interest.

The preliminary design process for passive solar is quite simple since it involves the application of several rules of thumb and basic "passive sense" which have been developed by a number of experts who have been researching and building passive solar homes for several years.

For implementation of passive solar in the classroom, three main avenues have been identified. First, passive solar can be integrated with an existing architectural drafting course. A second strategy would be to integrate passive solar with building construction and in most cases the activity emphasis would vary depending upon the course combination. However, the third method is preferable and that is to let passive solar stand alone since it is really too large and too important to squeeze into a course which is probably already overflowing with too much content.

PRECAUTIONS: The instructor should be aware of several pitfalls in passive solar and consequently should exercise some caution in this regard. First of all, the design procedure recommended for use in secondary school instruction is a preliminary design procedure. The results will be accurate enough to develop plans on a conceptual basis. However, in order to use the plans for actual construction, a final design must be completed. This involves a detailed thermal load calculation and the application of insolation and weather data. This is necessary to come up with a final glazing and thermal storage size.

Passive solar is not without problems. We have all heard many wonderful accounts of this "new" method of solar heating and cooling. This method of heating is not for everyone since, because of its very nature, a certain amount of thermal swing must be permitted if any amount of efficiency is to be obtained. Variations of 10° to 15°F from morning to night are not at all uncommon. Although in the final design process, it is possible to reduce these variations to less than 10°F. Another problem is overheating in direct gain systems. On sunny January days, some people have had to open windows in order to get rid of excess heat that was not going into storage. This is usually due to poor planning and improper design methods.

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Passive Solar Building: A Compilation Of Data And Results. United States Energy Research and Development Administration.

AIAA. W-1:00-1

TENNESSEE CLUSTER APPROACH TO INDUSTRIAL EDUCATION. Dr. James Lorenz and Dr. Michael R. Bachler, Dept. of Industrial Studies, Middle Tennessee State University, Murfreesboro, Tennessee.

Introduction

In the decade of the 1960's federal legislation and the concept of career education established a base for a renewed look at the role of industrial arts in Tennessee. A comprehensive vocational education act was passed in Tennessee in 1973 requiring that vocational education be made available to 50% of all students in grades 9-12. At this time industrial arts came under the administration of vocational education as one of its service areas with the responsibility of carrying out the prevocational component of the legislation.

Two documents, the Tennessee Industrial Arts Curriculum Model for industrial arts and the Vocational-Technical Education Consortium of States (V-TECS) catalog for trade and industrial education, provide the basis for curriculum development in Tennessee industrial education programs. The purpose of this presentation is to provide a practical illustration for the industrial arts teacher in using these two documents to carry out the intent of the prevocational component of the legislation.

Tennessee Industrial Arts Curriculum Model (TIACM)

To keep pace with these developments Tennessee developed a descriptive brochure on industrial arts in 1972 stating goals/objectives and relating them to career clusters. A resource bulletin was developed in 1973 carrying these concepts further and suggesting course outlines and a continuum of industrial arts programs from K-adult education. These efforts were further refined in the TIACM developed by a statewide committee in 1976. The four career clusters of Manufacturing, Construction, Communications, and Transportation and Power form the basis of the industrial arts curriculum. A definition, goals and objectives from K-post-secondary levels, suggested courses and units are presented in the model.

Articulation Process

The following process will show how the industrial arts teacher can sample content from trade and industrial education programs to explore the career clusters mentioned above. The focus is on the prevocational component of industrial arts which is only one aspect of the total industrial arts curriculum model.

CURRICULUM MODEL

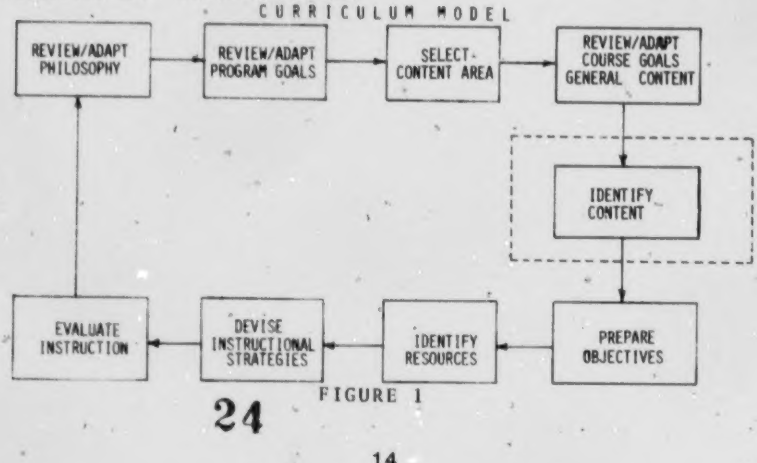
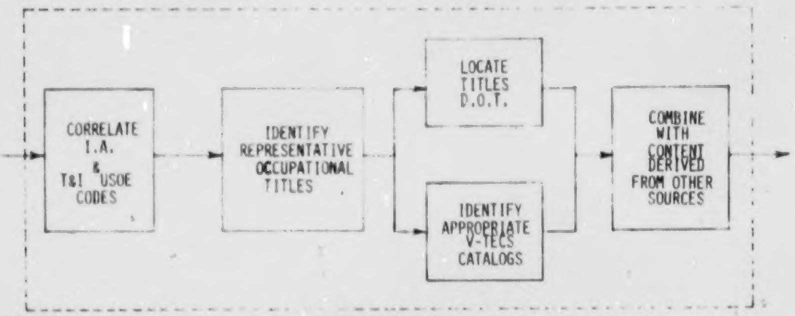


FIGURE 1

Figure 1 represents nine steps in the development of a course of instruction. The first five steps form the basis for this discussion. The industrial arts instructor should begin by reviewing and incorporating the national, state and local philosophies of industrial arts with his or her own philosophy. Next, program goals should be reviewed and adopted to fit local program needs. Pages 2 & 3 of the TIACM provide an excellent starting point for this process. The selection of a specific area of instruction and the identification of appropriate course goals is next. Again, the TIACM provides suggested courses and course goals at the jr. high and senior high levels.

The next step is to identify the specific content to be taught. Figure 2 details this process for the prevocational component of industrial arts.



CONTENT IDENTIFICATION
FOR
PREVOCATIONAL INDUSTRIAL ARTS

CORRELATE I.A. & T&I USOE CODES
IDENTIFY REPRESENTATIVE OCCUPATIONAL TITLES
LOCATE TITLES D.O.T.
IDENTIFY APPROPRIATE V-TECS CATALOGS
COMBINE WITH CONTENT DERIVED FROM OTHER SOURCES

FIGURE 2

First, USOE numbers and suggested units in the TIACM are used to specify trade and industrial education USOE code numbers found in Vocational Education and Occupations. This publication will identify representative occupational titles along with their Dictionary of Occupational Titles (D.O.T.) code number. The D.O.T. numbers will provide access to additional publications, the D.O.T. and the V-TECS catalog. The D.O.T. provides such job related information as classification by worker traits, industrial groups, vocational and skill requirements, physical demands and working conditions as well as brief job definitions. The V-TECS catalogs provide a list of tasks performed by workers in the occupation, the frequency with which tasks are performed, equipment lists, and bibliographies of curriculum materials available for the occupation. The information from these two sources can be combined to form the content base for prevocational industrial arts.

The prevocational content should be combined with the content derived from traditional sources in industrial arts to provide the basis for the development of objectives, the identification of instructional resources, and the design of instructional and of evaluation strategies.

Summary

This model is intended to provide a practical method for meeting the stated goals of industrial arts in Tennessee. It's strength lies in the fact that it gives the classroom teacher needed direction and, yet, provides room for creativity and individual preferences in the design of specific instructional strategies for a comprehensive industrial arts program.

AIAA. TH-1:00-7
CURRICULUM STRUCTURE FOR TECHNOLOGY EDUCATION. David L. McCrory, Associate Professor, Program for the Study of Technology, West Virginia University.

Developing technology-based curricula is a humbling experience. When considered in its entirety, and without an organizing structure, the set of phenomena known as technology represents a nearly incomprehensible body of knowledge. When viewed as a system of simpler elements and components, however, the phenomena can be reduced to a more manageable reservoir of content for curriculum decision making. One structural model is described below.

Consider that there are three dimensions of technology. In one dimension there are the *elements* -- universals found in all technological activity. In a second dimension there are the *contexts* or settings in which the action takes place. In a third dimension are the levels of technological *complexity*. These three dimensions form a curriculum content cube that can be used to design curriculum scope and sequence and to determine specific instructional units for technology-based educational programs.

ELEMENTS

In all instances of technology there are six identifiable elements: *humans* use *information* to put *energy* to work through the use of *tools* and *processes*, thereby changing *materials* to satisfy human needs and wants. These six elements are present in all instances of technology, and for curriculum development purposes can be seen as one dimension of the content cube.

It is important to understand that all six elements interact, yet each is a significant factor in technology. The human element, for example, occurs as the initiator, an integral part, or as a consequence of a technological act. A silversmith, for example, puts a great deal of himself in his craft. In a less obvious way, the human element exists in the form of punched tape used for automated machine operations. In the case of job-related hearing loss, the human element is a consequence of technological phenomena.

Information is most often manifest in the signs and symbols used as control mechanisms. Highway signs and traffic lights are examples. In some cases information is transacted among humans, sometimes among humans and machines, and at other times only among machines.

Energy is the element responsibility for doing work. It sustains the technological act by providing the other five elements with the ability to take action. As curriculum content, the energy element contains a number of fruitful topics for study, including energy sources, types, transmission, storage, and conversion.

Tools and machines are the extensions of human abilities. The computor, for example, is an extension of the human capacity to receive, order, store, and retrieve new information. Tools shape materials, convert energy, and process information.

Processes are types of changes rendered by the other five elements of technology. In the form of electrical impulses, information about the functioning of the human brain can be recorded and analyzed for medical purposes. Major league outfielders react to the crack of the bat as the sound gives them an instantaneous clue as to how far the ball will probably travel.

Materials are the stuff of technological phenomena. Materials clothe and shelter humans, transmit information, produce energy, and build the tools and machines we use. There are natural and synthetic materials, dynamic materials (e.g.: styrene foam), materials systems (e.g.: composites), and material properties (e.g.: hardness) to be studied in technology-based educational programs.

CONTEXTS

All six elements of technology occur in three mutually exclusive contexts: transportation, communication, or production. In this view, technological context has less to do with any given industry than it does with the purpose of the activity. For example, if one wishes to engage students in the study of magnetism, one way to do so would be to organize a unit about levitating, high-speed trains. Magnetism may of course also be investigated in the context of communication (e.g.: telephone relays), or production (scrap metal recycling).

Communication contexts include the visual, the acoustic, and the tele modes. Concepts such as "transmitter", "code", and "interference" are significant here as students experience how the six elements come into play.

Production may be the least abstract and yet the most misunderstood of the three contexts. Merely subdividing production curriculum content into construction and manufacturing misses the point. Production, in its most basic sense, has as its goal the generation of humans, information, energy, tools, and materials. Electrostatic copying, for example, may be better understood in the context of production, not as a type of graphic communication.

COMPLEXITY

A third dimension of the curriculum content cube has to do with levels of complexity. That is, there are different degrees of sophistication in the human use of information, energy tools, processes, and materials. Generally, it is more effective to develop technology-based programs for the elementary school around the less complex technological phenomena. In a unit on household systems, for example, youngsters can learn about how the plumbing, heating, and electrical systems work in their own homes. Senior high school students may be ready to handle the more complex aspects of computors and nuclear power, for example. For the inbetween ages, an "intermediate" level of context complexity may be appropriate.

SUMMARY

Although the curriculum cube does not make decisions for the curriculum developer, it does provide a map of the content. Thus, choices can be made with a clearer sense of the options available.

AIAA. T-1-2:30

NORTH CAROLINA SOLAR ENERGY CURRICULUM. W. Christopher Musselwhite, classroom teacher, Greensboro City Schools, Greensboro, North Carolina.

Solar technology is expected to expand rapidly in the next decade. Skilled workers will be required to design, manufacture, install, and maintain solar systems.

Institutions of education are beginning to recognize the necessity of gearing up to train the needed technicians. But it has been difficult for educators to acquire the information necessary for decision making about development of solar energy curriculum. One major reason for the difficulty is the lack of market research in the solar industry

The Solar Energy Research Institute in August, 1978 published a working paper entitled Direct Labor Requirements for Select Solar Energy Technologies: A Review and Synthesis. This paper by SERI attempted to synthesis existing estimates of labor requirements for the solar energy industry. This was accomplished by combining three manpower requirement surveys (Navaro Study, Mitre Corporation Study, and California Public Policy Center Study) with three market penetration studies (University of New Mexico Study, Mitre Corporation Study, and Solar Energy Industries Association Study). The results predicted the number of solar technicians that would be needed from 1978-1990 to install, manufacture, and maintain liquid flat plate collectors for domestic hot water and space heating needs. The estimates varied widely. The 1980 range was from 5,520 workers needed for 247,000 installations to 23,014 for 415,800 installations. The 1990 estimates ranged from 30,478 workers needed for 866,200 installations to 712,764 for 4,101,000 installations.[1] This study has many handicaps. It investigates only liquid flat plate collectors and there is considerable divergence among the estimates. However, it does indicate a growing need for solar technicians.

What is being done to meet this growing need for solar technicians? According to Doggette and Crowell, "at present there are at least ten postsecondary insitutions that have students enrolled in one and two year programs entitled Solar Technology. Shorter programs, usually CETA funded, have graduated solar workers in 1977 and 1978. The number of schools introducing solar education modules into existing programs is increasing rapidly".[2] But, until this school year 1978-79 no efforts were being made at the secondary level to train solar technicians.

The North Carolina Department of Public Instruction initiated a training program this year in solar technology. The original funding proposal title was "A Trade and Industrial Education Proposal to Develop and Promote Utilization of Solar Heating/Cooling in North Carolina. The rationale for the program was based on the fuel shortages experienced in the past few years. The specific purpose identified for the program is to reduce by 25% or more the consumption of fossil fuels in this state within five years.

The stated objectives of the North Carolina Solar Energy Curriculum portray a program which will · 1) be pro-solar by fostering and encouraging the development of solar energy in North Carolina and 2) will train technicians on a realistic level for jobs in the young North Carolina solar industry. Actually these two goals are inseperable. For the industry to grow thus providing jobs for the solar technicians being trained the school must act as an advocate of solar energy, helping to educate both the public and private sectors to its potential.

The project design took the form of a revised course in air conditioning and heating and included design, fabrication and installation of solar energy components and systems. The program is to be state funded for the four year pilot project period. There is one program in each of the eight educational districts of North Carolina with two additional programs being implemented in areas of population concentration for a total of ten pilot programs.

The four year pilot projects are being funded with grants from the Appalachian Regional Commission, North Carolina Department of Commerce, and the North Carolina Department of Public Instruction. After the pilot programs are ended the local schools must assume the responsibility for funding the programs.

After visiting five of the ten pilot programs and interviewing the instructors, I developed a list of suggestions that I feel could contribute to the initial success of similar programs in other states for anyone considering such an endeavor. The following are from that list.

1) Give the instructor ample time to plan and prepare before students arrive. This is a new area of instruction and new curriculum and much research, planning and tooling up time is needed.

2) Administrators should allow themselves time to carefully plan and determine a cohesive direction for the program so that consistency from program to program can be achieved and confusion, which especially can endanger the success of a controversial program can be eliminated.

3) Facilities must be carefully considered. Some of the programs are housed in new byildings with the instructors unable to step on the roof without vciding the architects warrenty. Others have no drainage or running water with no provisions for adding them. An older building with no restrictions may offer the best choice of sites.

4) The administrators of the program must recognize the broad applications of solar energy and the variety of ways that solar energy can be captured. Passive and active systems must be included. Our efforts must not be limited by prejudices or lack of information.

5) Due to a lack of familiarity with the subject matter, students should be carefully selected for participation in the program. They need to have an awareness and curiousity for solar energy. Even if this requires having sub-standard sized classes initially, it is very necessary to insure the morale and enthusiasm of the instructor who after all is at the center of the programs success.

[1] *Direct Labor Requirements for Select Solar Energy Technologies: A Review and Synthesis*. SERI/RR-53-045. Solar Energy Research Institute, Golden, Colorado, August 1978. pp21-23.

[2] Doggette, John R. and Mayme R. Crowell "Technicians: Where Do We Stand". *VocEd*. January 1979, p33.

AIAA. T-10:45-4 "PARKE'S ADVENTUROUS PROJECTS"

NELSON L. PARKE, Southwest Missouri State University, Springfield, MO.

Parke's Adventurous Projects is a new approach to what Industrial Arts teachers have been trying to do for years, that is, use projects to teach many different materials, tools and processes. This new approach uses educationally efficient projects that are the heart of a carefully planned program. The program can be used to supplement or replace the projects in a school's current program.

OBJECTIVES AND FEATURES OF PARKE'S ADVENTUROUS PROJECTS:

OBJECTIVE #1: A program where the student can have practical experiences with a maximum number of materials, tools, and processes in a years time and still have take home projects. The average junior high student should be able to complete all of the projects listed at the end of this paper in less than 100 fifty five minute class periods. Add to that another 30 to 45 periods for the drafting and there is still time left for the teacher to give safety instruction, lecture, have clean up days, tours, films or whatever.

OBJECTIVE #2: A packaged program for teachers. It is very difficult for one teacher to develop educationally efficient projects that provide a wide range of practical experiences. Parke's Adventurous Projects is a program that is designed to fill that need.

OBJECTIVE #3: An effective program with minimum investment for the school and students. Estimated cost for all projects is $15-$17.00. Tooling costs for the entire program are relatively low.

OBJECTIVE #4: A program where the student can proceed rapidly at his own rate, with minimum assistance from the teacher.

FEATURE #1: Emphasis is upon concepts. This can be summed up by saying "Acquaint them with the possibilities."

FEATURE #2: Careful analysis and selection of simple projects. Analysis is the key to the whole program. For example: one project, a yard sign was analyzed and redesigned. The result was a sign that cost less for materials, is more versatile, reduced student work time 40% and cost $4,000 less for tooling. All of this was done without losing practical experiences. In fact the program gained experiences!

FEATURE #4: Semi-programmed. With the exception of the mass production all project work is individualized and semi-programmed. The teacher is more of a troubleshooter than a dispenser of information.

I have a goal, it is "Something different every day." This goal is particularly important with junior high students. They usually have a lot of energy and enthusiasm however, their attention span is usually very short. If a particular activity takes two or more days doing the same thing they slow down. If they are drop forging, hardening and tempering tool steel one day, sandblasting, dye penetrant testing and casting water extended polyester resin the next, metal blanking, metal spinning, explosion forming, hydraforming metal the next day, sand casting and permanent mold casting the next and molding rubber the next, and they keep moving from one process to another every day, or sooner, they will work hard all year and discipline problems will be less.

A drafting book called "Lines and Views" uses problems that have been carefully designed and analyzed to teach certain line-view relationships. Analysis and the use of a sketching-drawing technique allows the student to cover a lot of material in a short time.

The first project work is a mass production project. They produce 3 game set boxes per student. Production rate is about one box every two and one half minutes.

After production the students work on individual projects. The teacher explains the system for locating materials and tools and goes over the instructions for using the lab manual. They are told "Go to work." The manual tells the student what to do and how to do it, so few demonstrations are needed. If they are needed they are given when the student is ready to do the work.

A list of Parke's Adventurous Projects and a few of the experiences provided are listed below. Notice the periods normally required for a Junior High student to complete each unit. A period is 55 minutes long.

PEN SET 3 periods
  Shell molding, milling,
  Wood flour molding.
SCREWDRIVER 3 periods
  Drop forging, sandblasting,
  Dye Penetrant testing for cracks,
  Casting water extended polyester.
GAME BOXES (PRODUCTION) 5 periods
  Mass production,
  Go-no go gage,
  Production fixtures.
CHECKER HOLDER 2 periods
  Fiberglass layup.
LEATHER 1 period
  Cutting leather (die cut).
CERAMIC DECORATIONS 1 period
  Dry pressing ceramics,
  Glass to ceramic adhesion.
GLASS 2 periods
  Cutting and Seaming glass,
  Engraving and etching glass.
STYROFOAM 3 periods
  Molding expanding styrofoam.
CHESSMEN 8 periods
  Slip casting ceramics,
  Green sand mold casting.
FEET 2 periods
  Molding and curing rubber,
  Rubber to glass adhesion.
CHESSBOARD 3 periods
  Use of end gages,
  Laying floor tile.
CHECKERS 3 periods
  Tumble polishing wood,
  Hot stamping.
PUZZLE 5 periods
  Making polyester laminate,
  Drill fixtures,
  Injection molding plastic,
  Relief and thermography printing.
CANDLE 4 periods
  Metal blanking die,
  Metal spinning,
  Explosion forming,
  Copper enameling,
  Hydraforming.
YARD SIGN 12 periods
  Routing,
  Reflective glass beads,
  Arc welding, brazing,
  Mixing and casting concrete,
  Oxygen acetylene cutting.
SHEETMETAL TRAY 5 periods
  Pressforming metal,
  Fluidized bed coating.
KEY CHAIN 1 period
  Compression molding.
PEN FERRULE 6 periods
  Most metal lathe operations.
4-IN-A-ROW 5 periods
  Casting cultured marble,
  Blowforming,
  Silk screen printing.
ENGINES 3 periods
  Identification of parts,
  cycles of 4 and 2 stroke engines,
  Use of mechanics tools,
  Adjust points and carburator.

Anyone interested in using this program should contact:

Nelson L. Parke
805 S. Devonshire
Springfield, MO 65802

DRAFTING

T-1:00-9
ACIAS Special Interest Session
Topic: Implementing Competency Based Curriculum Guides
Dr. John E. Bonfadini, Supervisor of Industrial Arts and T&I, Prince William County Schools, Manassas, Virginia

Practical Approach to Implementing Competency Based Instruction in Industrial Arts Programs

The continual development and changing of curriculum materials to reflect present educational concepts is a never ending task for Industrial Arts Supervisors. Present trends in curriculum construction point toward designing competency based programs of instruction. The merits of competency based learning are well recognized but caution should be instituted in the development of competency based curriculum methods and materials for classroom use. Many times relevant ideas are lost in curriculum guides that provide no practical purpose for the classroom teacher. Curriculum guides that remain on shelves or in file cabinets serve no useful purpose. The implementation system presented in this curriculum proposal requires the instructor to use the curriculum guide as a progress chart for student evaluation. Each Industrial Arts course is divided into areas of instruction. As an example, Power and Transportation contains the following instructional areas: thermal engines, hydraulics, pneumatics, electrical power, alternate energy sources. Each area is divided into learning units such as thermal engines contain instructional units in small engines, automotive engines and special engines (Wankel, diesel, marine). Each learning unit has an overall general performance objective and a subsequent general criterion reference measure.

To evaluate an individual student's progress all specific learning objectives of a given learning unit are listed in student hand-out sheet. (Figure 1). The specific objectives are categorized into one of three levels by either degree of necessity to perform the task or degree of performance difficulty. The objectives of a cognitive nature also list answers or example problems for the students' information.

Once completed, the instructional unit is provided to the student as a hand out at the beginning of each learning unit. The student checks off each objective completed in the three instructional levels. Teachers verify the student's progress at regular intervals. Each individual objective is weighed by a teachers curriculum group to reflect a total score of 100 points. These scores provide the student and parent with relevant evaluation as to how the individual child is meeting the learning unit general objective and can further be compared with the achievement of other students local school or county system. Standard cognitive tests as well as psychomotor activities have been developed to evaluate the instructional progress of students. In a large school county system such as Prince William, Virginia, this procedure greatly adds to developing a cohesive industrial arts program.

As a communications device, curriculum materials following this specific design will assist greatly in informing parents, students and other educational personnel as to the content and progress of individuals in Industrial Arts programs. Fully implemented, these procedures can assist in determining relevant needs for future curriculum changes.

CURRICULUM AREA: Power and Transportation

INSTRUCTIONAL OBJECTIVE: Introduce students to the theory and practical use of mechanical and electrical devices used to convert energy to power.

AREA: Thermal engines

LEARNING UNIT: Small gasoline engines

PERFORMANCE OBJECTIVE: After adequate information and instruction, the student will disassemble and assemble a small engine, explaining the theory and function of the engine's operation.

CRITERION REFERENCE MEASURE: Given proper tools and equipment, the student will properly assemble and disassemble a small gasoline engine to manufacturer's specifications and complete necessary work sheets.

PERFORMANCE GUIDE: The student will:

LEVEL A (sample items)

___1. Be able to recognize a small engine.
___2. Recognize the difference between 4 stroke cycle and 2 cycle engine.
___3. Know safety procedures for working with fuel: (a) gasoline; (b) kerosene; (c) diesel; (d) propane.
___4. Identify basic systems of 4 cycle small engine: (a) ignition; (b) mechanical; (c) carburetion; (d) lubrication; (e) starting; (f) cooling.
___5. Identify major systems of 2 cycle engine: (a) fuel system; (b) mechanical system; (c) lubrication; (d) starting; (e) cooling; (f) ignition.

LEVEL B (sample items)

___1. Mix fuel in proper ratio for 2 cycle engine.
___2. Measure by: (a) volume; (b) weight.
___3. Be able to identify major parts of a diaphragm carburetor: (a) needle; (b) seat; (c) diaphragm.
___4. Be able to identify major parts of a float type carburetor: (a) needle; (b) seat; (c) float.
___5. Be able to identify major components of carburetors: (a) venturi; (b) idle circuit; (c) high speed circuit; (d) air foil.

LEVEL C (sample items)

___1. Inspect and locate defective components.
___2. Repair and assemble carburetor.
___3. Order repair parts for carburetor based on manufacturer's specifications.
___4. Visually inspect and repair 4 cycle engine mechanical system: (a) cylinder hone; (b) micrometer (inside and outside); (c) valve seat grinder; (d) valve seat lapping tool; (e) valve facer.
___5. Inspect oil for: (a) contamination; (b) metal particles; (c) sludge.

(Figure 1)

AIAA. T-9:00-19

IMPLICATION OF DEVELOPMENTAL TASKS AND INSTRUCTIONAL CONTENT IN CURRICULUM DEVELOPMENT.

Marvin I. Sarapin, Assistant Professor, Department of Industrial Education, Purdue University, West Lafayette, Indiana.

INTRODUCTION

Over the past several decades, there has been considerable concern for improving industrial arts education. Individually and collectively, we have re-examined the definition of our field, the goals and objectives of our programs, and our relationship with other areas of instruction within the school environment. Curriculum development ventures focusing on updating and expanding the content and methods of industrial arts instruction have been completed and disseminated. However, concern has been expressed in our field that program improvement efforts have focused too narrowly on expanding the content base of instruction, while neglecting other factors important to the curriculum development process (Maley, 1975; Brown, 1977). This criticism of past curriculum development maintains that program and curriculum improvement involves not only the improvement of instructional content, but also the improved utilization of information concerning the growth conditions of learners. Literature associated with the study of human growth and development can assist curriculum developers in focusing on the developmental tasks of youngsters (Tryon & Lilienthal, 1950; Havighurst, 1952).

DEVELOPMENTAL TASKS

The concept of developmental tasks maintains that there are certain major learnings, adjustments, or tasks that face all individuals in a given society (Tryon & Lilienthal, 1950, p. 77). Successful achievement of these tasks contributes to the individual's happiness and to success with later tasks, while failure leads to unhappiness in the individual, disapproval by the society, and difficulty with later tasks (Havighurst, 1952, p. 2). Hierarchical listings of specific tasks related to the physiological, sociological, and psychological development of learners have been compiled to assist the educator in utilizing the knowledge of developmental tasks. One specific example (Tryon & Lilienthal) listed a series of specific behaviors associated with each of the five stages of development: infancy, early childhood, late childhood, early adolescence, and late adolescence. The concept of developmental tasks can provide the curriculum developer and educational practitioner a useful tool to help identify what students are internally attempting to accomplish at their specific stage of development. Developmental tasks can also supply the educator with clues needed to select and structure learning activities designed to accomplish the goals and objectives of an instructional program while considering the behavioral development of students (Maley, 1975, p. p. 239).

STATE-LEVEL APPLICATION

The recently developed Maryland Industrial Arts State Curriculum Guide has focused on the developmental tasks of youth as the starting point for curriculum development. Developmental tasks similar to those identified by Tryon & Lilienthal were identified for early childhood, late childhood, early adolescence, and late adolescence. The unique contribution of the guide to curriculum developers is the included list of sample student behaviors (activities) associated with the general school environment and the industrial arts environment. Although the sample behaviors listed in the guide were not intended to be exhaustive or complete, they can serve as a point of departure for educators interested in incorporating concern for individual growth and development into the curriculum development process. The design, selection, and organization of instructional activities to allow students to experience successful attainment of the developmental tasks thus becomes the essential responsibility of the local industrial arts curriculum developer.

LOCAL-LEVEL APPLICATION

During the 1977-78 school year and summer, several local education agencies in Maryland conducted workshops to apply the foundation presented in the *Maryland Guide* to the local curriculum development process. Participating teachers were able to use developmental task data to develop and revise instructional programs centered upon the content of industry and technology. Although the instructional activities developed were organized according to a content base, the growth and development of students was the functional starting point in curriculum development.

REFERENCES

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Maley, D. Student development - An essential base for program development. *Proceedings of the American Industrial Arts Association 37th Annual Conference*, 1975, 239-245.

Maley, D. The developmental tasks of youth - An important factor in program development. *Man/Society/Technology*, 1975, *34*, 244-248.

Maryland Industrial Arts State Curriculum Guide (draft copy). Maryland State Department of Education, 1976.

Tryon, C., & Lilienthal, J. W. Developmental tasks. *Fostering Mental Health in Our Schools*. Washington, DC: Association for Supervision and Curriculum Development, 1950.

AIAA. TH-2:30-4:00
CLASSROOM APPLICATIONS OF AT: ENERGY & FOOD PRODUCTION. Robert W. Knight, Graduate Research Assistant, Office of Research and Development, West Virginia University, and, Dennis M. Scanlin, Graduate Research Assistant, Technology Education, West Virginia University, Morgantown, West Virginia.

Most contemporary Industrial Arts programs seek to help students understand, appreciate and function effectively in our Industrial/Technological society. In order to fulfill these goals, educators have often identified the course content through a contemporary analysis of our technological milieu. Many programs mention production systems as major components of this milieu. These production systems are often identified as manufacturing and construction, and there has been much work done lately to develop educational programs in these areas. However, the largest single industry in the United States, food manufacturing is, in general, seldom mentioned as possible Industrial Arts content.

Food production has traditionally been the domain of Vocational Agriculture, however, many schools do not even have such programs and the ones that do, reach only a small percentage of the student body. By incorporating food production into our Industrial Arts programs, especially at the Junior High level, we can be assured of exposing all students to one of the most controversial and important components of our present Industrial/Technological society.

Food production today in the United States is highly machine and energy intensive. The use of large farm equipment has contributed to a decline in the number of small farms, increased in urban populations, and reduced ecosystem stability. Because of problems, such as fossil fuel shortages, dissatisfaction with the quality of the environment and human life, many people are exploring alternate life styles which will allow them to have more control over the quality of their life. The exploration of alternatives and the acceptance of change has become a way of life for many in the Industrial World. If we are to truly prepare students to live in this society, we must prepare them to cope with and institute change. Students should be challenged to explore alternatives to our increasingly inappropriate technologies based on rapidly disappearing natural resources. By studying food production, students will become aware of present production problems, and also have the opportunity to explore and develop appropriate alternatives to our present food production technologies.

The term Appropriate Technology (AT) has been coined, described and referenced by many different groups and individuals to include a broad range of meanings. The AT which is addressed in this paper considers it as an "approach" to the application and utilization of technology and not a single prescribed package of technology. Because there exists different cultures and geographical groups which result in different needs, the technology which should be incorporated in these varying circumstances should differ to effectively and appropriately meet those different needs. Therefore, the technology applied (AT) should not be a force fit into the society and culture, but rather blend itself and adapt to that society and culture.

The third world developing nations of the world have most frequently been the target of AT discussions but this myopic view should be expanded to include all nations of the world. The National

Science Foundation sponsored a research effort aimed at the area of AT and agriculture in the United States.[1] With this beginning there is hope that further exploration, development and application of the concepts of AT will take place. Again, the technologies applied and utilized should conform to the needs and circumstances of the individual groups. Regions, communities, family units, and individuals should be aware of the options and opportunities associated with the ideas of AT. This includes me and you and our students.

There are some reoccuring patterns or themes associated with the tools and techniques utilized with AT. The main ones include considerations of (a) economics, (b) local control, and (c) energy. The consideration of economics is reflected in items used which are low in capital costs and small in scale. This permits individuals or small groups to afford that technology.

Wherever possible, local materials are incorporated into the product or process. Local production and manufacture of the tools is promoted to capitalize on the skills of those in the area and provide jobs within the community. (This results in a local understanding of the technology which provides the opportunity for this technology to be controlled at the local level).

Thirdly, the consideration of energy consumption promotes the utilization of renewable energy resources wherever possible. This contributes to the conservation of the existing finite energy resources and also permits a reduced degree of dependence on outside resources necessary for continued existence. Without fossil fuels the gas engines will not run but no one has a monopoly on the sun, wind, or water resources.

The values of AT could be incorporated into Industrial Arts by having students develop new tools, techniques, and technical systems which would facilitate food production and at the same time enhance the quality of human life. Students would consider total energy requirements, ecological principles, and social costs in their study of these technical systems. Some possible activities include soil sampling, plant growth experiments, hydroponic gardening, greenhouse and/or cold frame construction, foraging for wild foods, construction of animal traps, and solar food driers and cookers.

One of modern mankinds most disturbing problems is the enormous amount of energy used to produce, prepare and market food. If students are to fully understand our Industrial/Technological society, they should become aware of the largest single industry in the United States -- Food Manufacturing. Students should be provided with the opportunity to explore contemporary production systems and their problems. The values of AT would serve to direct the students attention to important issues in our present world and hopefully prepare them to responsibly develop, guide and direct technology in the future.

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[1] Appropriate Technology and Agriculture in the United States. Washington, D.C.: Integrative Design Associates, Inc., 1977. Sponsored by the Division of Exploratory Research and Systems Analysis of the Research Applied to National Needs Program, National Science Foundation.

ELECTRICITY/ELECTRONICS

AIAA. TH-1:00-2:30

DEVELOPMENT OF A MULTI-TRACK, MULTI-ENTRY-POINT PROGRAM IN ELECTRICAL AND ELECTRONICS TECHNOLOGY.

Troy F. Henson, associate professor, Department of Industry and Technology, East Texas State University, Commerce, Texas.

The Department of Industry and Technology (IT) at East Texas State University (ETSU) has an ongoing project, which was initiated in the fall of 1977, to develop a program in electrical and electronics technology at both the undergraduate and graduate levels.

The first steps in the development were to evaluate the need for an electrical/electronics (EE) program and to study the present status and history of EE related curriculum, labs, and library resources at ETSU. Based on the results of these initial investigations, program objectives, goals, and implementation plans were established; and potential problems were identified. The overall development approach was structured in a dynamic format that utilizes feedback with periodic reviews for updates in goals and plans.

Prior to the initiation of the formal EE development project, there had been a precursory effort which resulted in seven EE courses (one junior and six senior level), three of which had been taught previously, two on a regular basis. The facilities that had been constructed included two large modern EE lecture/lab combination rooms with adjoining storage rooms and printed circuit lab room. There was a modern machinery lab facility; and the remainder of the labs were well equipped, though dated, with basic instruments and components. The library had an extensive collection of EE technology and engineering books and IEEE periodicals. The University was also found to offer strong interdisciplinary strengths related to EE, particularly in the Physics, Mathematics, and Computer Science Departments, all of which are in the same college as the IT Department.

It was determined through surveys of technical and personnel management that:

(1) A large market exists for EE technology graduates from quality programs, and this market is especially strong in the Dallas/Ft. Worth Metroplex.

(2) There is a definite need, that is not presently being met, for part-time education in EE for employees in area industries.

It also became apparent that there is a need for EE education for full-time ETSU students who are majoring in other fields.

In order to meet the identified needs, program objectives and implementation plans were defined. Expected problems and barriers, such as diverse student and faculty backgrounds and objectives, tight educational budgets, the electronics revolution, were taken into account. The primary objective is a quality EE program that provides students with

-training in practical, technical, "confidence-building" skills
-a strong mathematical, scientific, and business/management base
-effective communications skills
-a speciality in some area of EE

The EE curriculum is being developed in a vertical structure, utilizing existing IT Department EE courses where possible with appropriate alterations and the interdisciplinary strengths of the University. The labs are being updated with limited numbers of modern instruments and components to provide familiarization and to support the teaching of the fundamentals. The library is being kept up-to-date.

The curriculum is being developed in a MULTI-TRACK format to allow the EE majors an opportunity to specialize and the non-EE students unique minors. At the present time, there are six options: communications electronics, computer electronics, electronic systems, electrical power systems, EE and management, geophysical electronics. Each EE major takes a common core consisting of eight liberal arts, four business/management, nine math and science, and eight IT (four of which are EE) courses. The student then selects 11 courses following his/her option. The curriculum is somewhat unique at this point in that in addition to advanced EE courses in IT, University interdisciplinary strengths are used in the speciality options. For example, the computer electronics major may take as many as six computer science courses, and the geophysical electronics major takes geology courses from the Earth Science Department and geophysical exploration courses from the Physics Department.

The curriculum is also being developed in a MULTI-ENTRY-POINT format in order to meet the needs of full-time and part-time transfer students. Attempts will continue in the future to work very closely with area community colleges and industries to make the program accessible to a wide variety of backgrounds.

At the graduate level, a curriculum leading to the M.S. in IT with a major in electronics systems has been developed in conjunction with E-Systems, Greenville Division. The curriculum is oriented towards practical communications, computer, and control systems. It was initiated in the Spring semester, 1979, with 24 graduate students enrolled.

Program goals for the next year include establishment of the formal industrial advisory committee; publication of a brochure describing the undergraduate EE program and updating the electronics systems graduate brochure; initiating research on microcomputers in process control and microcomputers in digital filtering. Long-range (five year)goals include design and implementation of laboratory microcomputer interfaces to transducers, servos, plotters; establishment of a student co-op program in EE with local industries; founding of a student IEEE chapter; attainment of ECPD accreditation.

ELEMENTARY SCHOOL INDUSTRIAL ARTS

ACESIA W - 9:00 A.M. - 10:15 A.M.

Implications of P. L. 94-142 for Elementary School Industrial Arts

Clarence R. Calder, Jr. Professor, Department of Elementary Education
University of Connecticut

As a result of Public Law 94-142 and programmatic efforts, many states are attempting to develop instructional programs that can be used to coordinate the education of handicapped children in regular classrooms and in special education programs. "What's wrong?", "What to do?" and "How to do it?" are three major questions asked by the classroom teacher faced with the dilemma of working with handicapped children in a regular classroom environment. These three questions will be discussed and their implications for elementary industrial arts will be explored.

The Individual Educational Program (IEP) is the most discussed part of P. L. 94-142. IEP's are not "add-on" paper requirements to satisfy regulations; rather, they are individual programs written to specify how the educational needs of each child are to be met. When properly done, the process of writing an IEP changes the way educators think about children. The IEP process looks at and attempts to answer the questions of "What's wrong?", "What to do?" and "How to do it?". It provides educators with an alternative to a program centered curriculum, one that was designed and then children assigned to the established programs.

The IEP process has changed this practice by placing the emphasis on a child-centered curriculum. A curriculum in which the needs of the child are identified by diagnostic tests and/or observational techniques. This information presents the "What's wrong with the child?" and is based to some degree on a scientific approach because any identified learning difficulties must be based upon evidence from more than one source. Public Law 94-142 is very clear in stating that the individualized educational program shall be developed in a meeting and specifies the individual who shall attend, and what the outcomes shall be. The Law specifies the minimum number of persons to be involved in the meeting. It states that there shall be a representative of the school system, who should ensure that the language used to describe the learner's problems (what's wrong) and instructional practices (what to do and how to do it) be of such a nature that it can be understood by all committee participants.

The importance of designing a sound program which meets the individual needs of a handicapped child cannot be overstated. Remember, the special needs student has already been identified as having difficulty with the regular scope and sequence of the curriculum.

The term individualized educational program is an important concept which requires an explanation. Individualized means that the educational needs of a single child should be analyzed rather than those of a class or group of children. Educational means a program limited to those elements of the child's education. While program represents the services which will actually be provided the child as compared to a plan that provides guidelines from which a program may subsequently be developed.

There is no federal form for developing an IEP, however, the IEP must include:

1. A statement of the child's present level of educational performance.
2. A statement of the annual goals, including short term instructional objectives.
3. A statement of the specific educational services to be provided.
4. The extent to which the child will be able to participate in regular education programs.
5. The projected date for initiation and anticipated duration of such services.
6. Appropriate objective criteria, evaluation procedures, and schedules for determining, on at least an annual basis, whether instructional objectives are being achieved.

Implementation of an IEP Objective

A review of an individual's IEP may indicate that one of the short term objectives, in the Social/Emotional Development area is to have the learner work with others on a cooperative project. The classroom teacher is concerned because the child has repeatedly refused to play or work with other children. The teacher, at this point in the learner's growth and development, is concerned with changing the child's attitude about working cooperatively with others.

The classroom teacher utilizing industrial arts type activities may want to analyze some upcoming activities for ways to use these experiences to gradually modify the learner's behavior toward working cooperatively with others. The first activity may be a study of the occupations of the children's parents. Each child may be required to draw a picture of their parents' occupation. The child works independently of the group making his drawing. The teacher discusses with the class how the finished drawings will be used in a group display. The theory underlying this approach is to foster in the learner a willingness to contribute his finished drawing to a group display. The child during this early experience will have only limited experience interacting cooperatively with others. The idea is to have the child work on a number of activities where his interaction with other children gradually increases over a period of time.

Another activity, when the teacher feels the child is ready to work cooperatively with others, could be the construction of a puppet stage using frame construction. The construction of a puppet state requires individuals to work very closely together in planning, as well as sharing in the use of tools, materials and equipment. Some tasks may require one child holding materials for another while they are being cut or fastened. It is important to note that this type of behavioral change may require six to ten months or longer; and our responsibility is to move the child from one experience to another. We should always remember, that one of our goals is to change the child's attitude about working and/or playing cooperatively with others.

These are only examples of how one of the short term objectives listed on the IEP can be carried through using industrial arts type activities. Other industrial arts type activities can be used to bring about behavioral changes in the areas of language development, reading, writing, listening and speaking. All that is required is for us as educators to remember the educational program must meet the specific needs of the individual child.

ACESIA. W-1:00-5

ELEMENTARY INDUSTRIAL ARTS AND ELEMENTARY CAREER EDUCATION.

William R. Hoots, Jr., Professor, Department of Industrial and Technical Education, East Carolina University, Greenville, North Carolina.

The purpose of this discussion is to compare industrial arts and career education at the elementary school level in order to identify the similarities and differences between the two. It will be shown that there are similarities, and that by broadning the scope of both career education and industrial arts, they could be combined into one segment in the elementary school curriculum that would provide the child with a solid base for learning to adapt to and to cope with our changing technological society.

A comparison of elementary school industrial arts and elementary school career education must begin with definitions of the two areas. For the purpose of this paper the definition of elementary school industrial arts developed by the National Conference on Elementary School Industrial Arts and the definition of career education developed by Kenneth B. Hoyt and others in *Career Education: What It Is and How To Do It* will be used.

Elementary school industrial arts was defined by the National Conference on Elementary School Industrial Arts in 1971 as follows: "Industrial arts at the elementary school level is an essential part of the education for every child. It deals with the ways in which man thinks about and applies scientific theory and principles to change his physical environment to meet his aesthetic and utilitarian needs. It provides opportunities for developing concepts through concrete experiences which include manipulation of materials, tools, and processes, and other methods of discovery. It includes knowledge about technology and its processes, personal development of psychomotor skills, and attitudes and understandings of how technology influences society."[1] This definition says that through industrial arts the child will develop an understanding of how technological change improves his environment and contributes to the fulfillment of his needs, that he develops an understanding of work through actual practice, and that he develops a positive self-concept and a positive attitude toward technological change.

Career education is defined by Hoyt and others ". . . as the total effort of public education and the community aimed at helping all individuals to become familiar with the values of a work-oriented society, to integrate these values into their lives in such a way that work becomes possible, meaningful and satisfying to each individual."[2] Hoyt further defines career education to include any meaningful and productive activity; besides the wage-earning occupations, there are many careers that offer no financial rewards but are engaged in for personal fulfillment and satisfaction.

A comparison of industrial arts and career education in the elementary grades indicates that the primary concerns of career education relate to a variety of occupations. These are not limited by design, but they often include the more exotic rather than the common. Industrial arts is the study of industrial technology, its tools, materials and processes. The functions of industrial arts are: (1) social, the effects of technology on society; (2) cultural, how our culture has evolved through technology; (3) technical, the use of tools, materials and processes; (4) vocational, discovering job possibilities that might be meaningful and satisfying; and (5) recreational, developing skills that would be useful in leisure time activities.

A review of several hundred reports from career education projects that indicated the inclusion of the elementary grades revealed that most had not developed a program for the elementary grades. Those with elementary grade programs tended to assign career awareness and self awareness activities to those grades. A review of activities in elementary school career education, both from reports and from pictures, indicated that those activities usually consisted of making reports, notebooks, bulletin boards, field trips, and having speakers visit the class. Less than one percent indicated that provisions were made for the child to engage in realistic experiences related to careers. By comparison, all children in elementary school industrial arts have the opportunity to engage in authentic experiences related to their area of study.

The common point between industrial arts and career education is the study of careers in career education and the vocational function of industrial arts. Career education encompasses all careers while industrial arts focuses on careers related to industrial technology. It seems that industrial arts is somewhat narrow in scope and should consider a broader look at career possibilities. On the other hand, career education is limited in the experiences it offers the child. Realistic activities related to the careers being studied, the opportunity to play the role of the worker, would enrich career education.

The first formal education for every child begins at the elementary school, and it is here that the foundation for all education must be laid. Today's elementary school pupil must learn skills necessary for him to be a productive citizen in tomorrow's world, and it is impossible to predict what society's needs will be at that time. We do know that with the ever expanding technology many of the jobs of today will be extinct tomorrow. At best we can help the child understand this phenomenon and learn to adapt to change. If he is to be a productive citizen and engage in careers that are both meaningful and satisfying to him, the primary goal of education must be to prepare the student for the world in which he will live and work, and this must begin at the beginning of his formal education, at the elementary school.

It seems that an ideal elementary school curriculum could be built around the consolidation of career education and industrial arts. A merger of the broad look at careers with pupil involvement in authentic activities centered around careers in a technological society, plus the broad look at the requirements for living in a futureistic society, would contribute to the development of a citizen able to cope with change in a life-work situation. Both industrial arts and career education have much to offer the elementary school child, but united into a single entity, they would far more than double their benefits to the child.

FOOTNOTES

1. Hoots, William R., Jr. (editor), Industrial Arts In The Elementary School: Education for a Changing Society (Greenville, North Carolina: National Conference on Elementary School Industrial Arts, 1971), p. 3.

2. Hoyt, Kenneth B. et. al., Career Education: What It Is and How To Do It (Salt Lake City, Utah: Olympus Publishing Company, 1972), p. 2.

ENERGY/POWER

AIAA. W-9:00-4
AUTOMOTIVE ENERGY CONSERVATION. Steve R. Carter, assistant professor, Department of Industrial Education and Technology, Northwestern State University, Natchitoches, Louisiana.

Passenger cars and light trucks account for approximately 14% of the total energy consumed in the U.S. Total highway transportation, including freight and bus, accounts for 18% of the country's total energy consumption. Automobiles alone consume almost three-fourths of all gasoline and 28% of all petroleum. The family car does play a major role in the total energy demand of this nation. Can the automobile consumer make a significant contribution toward the total conservation effort of our shrinking fuel supplies?

The individual automobile consumer can decrease the amount of fuel the automobile consumes in two ways: (1) through the way in which the automobile is driven, and (2) through its mechanical condition.

A careful driver can get 30% better gas mileage than the average driver. That same careful driver can also get over 50% better gas mileage than the careless driver. Based on the average fuel consumption nation wide, the average U.S. driver gets 13.72 miles per gallon in the average automobile. A careful driver can get 17.83 miles per gallon in the same car, while the careless driver will get only 11.89 miles per gallon. An examination of these figures indicate that the nation's average driver leans a little more on the careless side rather than on the careful side.

Secondly, it is known that the properly tuned vehicle gets 3 to 9% better gas mileage than the non-tuned vehicle, although performance variations can not be detected by the driver. Vehicles that openly display malfunctions usually consume well over 10% more gas than the tuned vehicle.

Inflation and environmental concerns have also ushered in compounding problems directly affecting the amount of fuel the automobile is consuming. Because of inflation, the average automobile is being pushed further than it used to be. In 1970 the average vehicle on the American highway was 5.55 years old. By 1975 this age had increased to 5.99 years. And in 1977 the average vehicle had been in use 6.23 years. The condition of the economy is also bringing about an increase in the number of automobile "do it yourselfers." Approximately 50% of all car owning households now change their own oil and perform other lubrication and maintenance services. Over 30% are performing some sort of tune-up service which might lead to poor fuel economy if performed incorrectly. To compound this situation further, automobiles are constantly becoming more and more complex, requiring greater skills in their maintenance. In 1967 only 54.5% of all cars contained some form of emission control components that might affect fuel economy if improperly maintained. By 1972 this fugure had increased to 89%, and to 97.3% in 1977. Figures also indicate that "do it yourself" maintenance is often being improperly performed, thus affecting fuel economy. Surveys reveal that some 34.1% of all car owning households change their own points. Yet only 6.3% employ the use of a timing light. Carburetor cleaner is used in 16.5% of the households, yet a vacuum gauge is used only 3.2% of the time for adjustment.

Industrial arts can play a vital role in informing young potential automobile consumers to the awarenesses of energy conservation in respect to automobile driving habits and proper automotive service. An "Automotive Energy Conservation" unit can be incorporated into most general shop and energy-power programs with little or no additional equipment expenditures. Depending on the nature and level of the existing industrial arts curriculum, an automotive energy conservation unit can encompass as little as one or two class periods, to several weeks, or even an entire semester.

Program objectives for a short unit might include such goals as to make students aware of: (1) driving characteristics that affect gas mileage and the effect each has on fuel economy, (2) the importance of proper engine service, (3) performance symptoms that signal the need of professional service, and (4) proper maintenance schedules. Dependent upon the student level and scope of the unit, student activities might include such things as: (1) checking tire pressure, (2) inspection of tire wear to determine wheel misalignment, (3) inspection of air cleaner, and (4) recognition of engine miss, hesitation, and starting response. Free publications from governmental agencies and private industries offer a vast array of facts and can be incorporated as texts for such units. (See references.)

More extensive programs could be expanded to include objectives directed to achieving competencies concerning: (1) the understanding of various automobile systems and (2) the use of service data and equipment when performing elementary tune-up procedures. In this type of unit, student activities might be broadened to: (1) checking ignition timing and automatic timing advances, (2) checking PCV valve, (3) checking and adjusting idle speed, and (4) checking for vacuum leaks.

Automotive energy conservation, as a unit in the industrial arts curriculum, will certainly not save all the energy presently being needlessly wasted in our nation's automobiles. At best, it will spare only a fraction. It can, however, be a feasible means of making prospective automobile consumers more aware of their individual responsibility as energy conservers, a responsibility the youth of today must face tomorrow.

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AIAA, W 9-10:15 a.m.
SOLAR ENERGY AIR COLLECTORS   Marshall S. Hahn, Associate Professor
Department of Technology and Industrial Education, New York
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Recently, I heard a speaker talking about the price of gasoline. He was trying to get the general public ready to accept the $1.00 per gallon price for gasoline that many have predicted and soon may be here. The price may be here, not by 1985, but as he was saying, 90 cents by the end of this year. Many people think that we are going to have to pay 90 cents for gasoline, but few think about fuel oil for home heating as being that high priced. Where are you on the opinion poll? If gasoline is $1.00 per gallon, "Where will home heating oil be?" Let me assure you, it won't be far behind. If 90 cents is going to appear by the end of the year, you can expect to pay 80 cents for home heating oil. The question that I want to ask is, "Can you afford it?" "Can the nation afford to pay out that much as fuel for inflation?" There must be some other way.

One of the other ways is the basis for at least part of my topic in this report. It is the suggestion that if you can't afford to pay 90 cents or $1.00 per gallon for fuel you had better start in the direction of some kind of solar system for your home even if you have to pay the piper on the price of gasoline.

As soon as one talks about solar energy, most people show that they are confused. The question immediately arises, "Which system is the most effective?" That question is very difficult to answer, but there is at least some research now that tells us that air collectors are more efficient than water collectors. And, if you are going to to do like many people, that is to install it part now and part later, then probably for sure the way to start is to begin with a simple air collection system. I make this suggestion with at least the following reasons in mind:

1. Flat plate air collectors are normally easier to build than liquid collectors. This is especially true of do it yourself projects.
2. Flat plate air collectors heat up more quickly than a similar water or liquid collector because
    A. Less mass is involved in air than in water.
    B. If you have storage, the storage of heat in pebble beds is usually more stratified with rock than with water and the temperature that has to be achieved is from 10 to 50°C lower than with liquid storage.
    C. If you have no storage, and you have turned your thermostat back at night, the ambient room temperature may be considerably lower and you can get useable BTU's sooner.
3. The flat plate air collectors pick up solar heat in useable BTU's earlier in the morning and later in the afternoon than do liquid collectors. This is essentially because of the stratification, but is especially true if a very thin collector plate is used and there is no storage.
4. The pumping power for air collectors is less than the pumping power needed to drive liquid collectors.

The recent work completed at Colorado State University at the Solar Energy Applications Laboratory, with which the writer is most familiar, indicated that the flat plate air system operated over a longer period of the day than the flat plate liquid system. This may not be true of advanced collectors. However, this report is not dealing with the advanced collectors because of their difficult construction.

With the four above mentioned ideas in mind, the home fabrication of an inexpensive yet profitable air collector should be possible. The use of some "off-beat" situations to save valuable BTU's from solar by using an east-southeast compass direction on vertical walls for early morning collection and west-northwest direction on vertical walls for late afternoon collection should be profitable if the cost of initial installation is not great. This proposal has been submitted to the Appropriate Technology section of the Department of Energy. The idea is to have extremely thin collectors so that almost immediate heat up can take place. If this proves feasible, almost every house in the United States can have some retro-fit applications.

In my own experience, with a hybrid system, it has been found that the flat plate air collectors are able to collect useable BTU's over a longer period of time. In the Colorado State University report, the air-heating collectors delivered more heat than the flat-plate liquid collectors, over several months of collection, by as much as 40 percent. This is a significant amount. The smallest household fans can be used to help move air from the living quarters through the collector and back into the living quarters at the rate of 1-2 cubic feet of air per square foot of collector per minute. Depending on the system, small fans that use as little as 12-15 watts of electrical energy can be used in conjunction with thermosiphoning passive systems. The initial expenditure for solar collectors is very minimal and as much as 20 to 30 percent of the space heating needs can be supplied by solar. This is especially true in certain parts of the heating season when oil fired furnaces are very inefficient.

The conclusion that has been reached by the writer is that when a person is starting with solar energy and is not able to invest much capital, the storage system should be omitted and air collectors should be utilized for the most efficient collection with the least collector area. All that can be collected is utilized immediately. The passive or hybrid collection systems should be investigated first before expensive active systems are discounted as being too expensive.

AIAA. TH-3-4:30

IOWA CURRICULUM--ENERGY AND POWER. Rex W. Pershing, associate professor, Department of Industrial Technology, University of Northern Iowa, Cedar Falls, Iowa.

The pedogogical approach to the area of Energy and Power has been to fragment the content into many courses such as electricity-electronics, power, and automechanics. The automobile as well as the production machines and lines of industry are complex systems consisting of four basic power systems: electrical, mechanical, fluid, and heat.

The students have often studied the technical aspects of a specific power system with no attempt made through course content to demonstrate the interrelationships and commonalities of power systems, and yet, many students enter into an industrial occupation which requires this understanding.

Power System Definitions. A Power System is a system which receives some form of energy, processes that energy, and performs work. A power system may be generalized as having three components: Input, Processing, and Output. INPUT refers to the many sources of energy which are used to accomplish work. Common forms of energy are: electrical, thermal, chemical, nuclear, mechanical, gravitational, and radiant energy. PROCESSING is the conversion and transmission of energy through a power system. CONVERSION is the process of converting energy from one form to another. TRANSMISSION is the process of transmitting energy from one location to another where it can be converted to do work. OUTPUT refers to the two forms of energy that perform work: force or heat. Since a power system is less than 100% efficient, an additional result of all energy conversion and transmission is a LOSS. A final aspect of a power system is CONTROL, which prevents the system from exceeding operational limits.

Energy and Power Systems Development Activity. The Energy and Power Systems Development Activity (EPSDA) is the activity designed to demonstrate the concept of an Energy and Power system and the technological concepts that are involved in that system. An example of an EPSDA would be a CO2 powered car or airplane.

Learning Activity Packets (LAPS) have been developed to allow the students to learn the basic technological concepts needed to understand and complete the EPSDA. A procedure that students are to follow for the completion of the packets and the completion of the EPSDA must be determined.

The instructor may elect to have all students involved in a single EPSDA; there may be several small group activities; each individual student may be assigned a different EPSDA; or each student may be involved individually on the same type of activity. The determining factor will be the facilities, equipment, the unique characteristics of the instruction methods to be employed, and interest of students.

The following outline, "Instructor's Procedure for Selecting an Energy and Power Systems Development Activity," will provide guidelines to help the instructor organize the EPSDA activity or activities.

INSTRUCTOR'S PROCEDURE FOR SELECTING ENERGY AND POWER SYSTEMS DEVELOPMENT ACTIVITY

Mouse Trap Car

I. Purpose: The purpose of this activity is to demonstrate the relationship of technology to the development of an energy and power system through the use of inexpensive materials.

II. Objectives: Upon completion of this course, a student will be able to:

1. Explain the energy and power systems model, either in writing or orally.
2. When given the names of technological concepts related to this system development activity, orally discuss the interrelationship of these concepts to the system.
3. More easily interact with other students in large and/or small group activities
4. Apply knowledge gained from the EPSDA to the development of another energy and power system.

III. Concepts to be learned:

1. Kinetic and potential energy
2. Friction (air, fluid, mechanical)
3. Bearings
4. Simple machines
5. Systems concept
6. Torque
7. Inertia
8. Gravity
9. Mass
10. Conversion
11. Motion
12. Reaction
13. Control
14. Efficiency
15. Weight to power ratio
16. Brake system
17. Guidance
18. Cost
19. Balance
20. Time

IV. Packets to be studied:

Friction, bearings and lubrication
Potential energy
Simple machines
System concept
Mass, gravity
Reaction
Guidance - levers and gears
Conversion
Motion - kinetic energy
Braking
Torque
Inertia

AIAA W-1:30-2 Energy Use Within The Food Production System, Edward C. Pytlik, Assistant Professor, Program for the Study of Technology, West Virginia University, Morgantown, WV.

We in the United States are proud of our highly mechanized food production system, and justifiably so. In the past 30 years, the U.S. has truely become the breadbasket for the world. The transfer of our technology, research, innovations, and inventions in the area of food production has saved countless thousands from starvation by allowing many developing nations to reach or almost reach self-sufficiency in food production.

However, there is a discordant sound to be heard among all of the prideful shouts praising our food production system. This sour note comes from the energy sector. The energy cost for all of the progress being made in food production has been horrendous. For example, from 1940 to 1970, fuel use in U.S. agricultural production more than tripled, energy used to run irrigation systems almost doubled, energy used to make farm machinery increased 9 fold, and the use of electricity on the farm increased from a factor of 0.7 to 63.8 (10^{12} kcal.) The food processing industry has more than doubled its energy use in the same 30 year period, and fuel used for transporting the grown food has more than quadrupled.

There is, however, one area of the energy sector whose contribution to the food production system is declining. From about 26 billion in 1920, the number of man-hours contributed to the food production system has steadily decreased to about 6 billion in 1970. At the same time, the total amount of energy input to the food production system increased from about 0.1×10^{15} kilocalories in 1920, to about 2.1×10^{15} kilo calories in 1970.

Is this low labor, energy-intensive food production the type of technology we should be transfering to other nations in these energy critical times? The "green revolution" food production tactics we so energetically urge developing nations to embrace require a more carefully prepared seed bed and-increased uses of irrigation water and fertilizer, all energy intensive activities.

There lies the delema. There is no question that developing nations need to become self-sufficient in food production, that this self-sufficiency will require the use of newly-developed high yielding varieties of seed, that these high yielding varieties require increased amounty of water, fertilizer, machinery, and fuel.

But are the energy intensive, sophisticated technologies that are being used in the U.S. today and transferred to other nations our only choice? I believe there are other, alternative strategies that can be used in lieu of the energy-intensive ones, both in the U.S. and abroad. These appropriate technologies are less energy intensive, less harmful to our world environment, and are more compatible to the overall social, cultural and/or economic structures in which they are used.

The most common method for preparing land in the U.S. is for the stubble from the previous crop to be plowed under in the fall. In the spring the land is harrowed, and fertilizers and pesticides are applied prior to planting. At various stages of growth, the land between the plants is cultivated and perhaps additional pesticides are applied. Therefore, a tractor has traveled over a given piece of land from 5 to 10 times, each trip consuming a given amount of fuel.

An appropriate technology alternative which would save considerable fuel is no-till farming. In no-till farming the new seed is planted without any turning over of the soil whatsoever. Experiments have shown that it is necessary to plow the soil only once every 3 or 4 years to ensure a maximum yield. This not only saves many gallons of fuel but tons of topsoil as well.

For a developing nation, an alternative is not to begin intensive mechanized farming practices. Instead these nations could devote intensive research activities toward making their usually small-plot, labor intensive food production system more efficient. Research devoted to improved animal powered land preparation tools and experimentation with no-till agriculture could be implemented.

Regarding the application of fertilizers, there are two techniques in which energy savings could be initiated in the U.S. The first is by far the simplist, cut the application rate of chemical fertilizers 30 to 50%. That is the amount of excess fertilizer the average American farmer applies to his land. Using corn producers as an example, while the yield per acre of corn was increasing almost 3 fold (from approximatly 30 to 80 bushels) the per acre applications of nitrogen increased 16 fold, phosphorus 3 1/2 fold, and potassium 12 fold.

The second technique is to use more natural fertilizers. The industrial fixation of nitrogen fertilizer production requires enormous amounts of natural gas. If natural fertilizer from cattle feedlots, hog confinements, and chicken operations, were fed into biogas converters, the residue could be used to fertilize the fields while the created gas could be pumped into existing pipelines, adding to the general energy pool instead of using energy.

As more marginal land is put into production, water as well as fertilizer becomes an important factor. Increases in irrigation also means an increase in energy input. To date, the major solution to demand for increased irrigation water has been to build huge dams. The energy costs of these dams, not to mention their dollar value, are such that it is difficult to foresee their break-even date.

An appropriate alternative to the construction of large dams would be to use the underground water available in most places through an extensive use of tube wells and shallow, open wells. Tube wells could be driven by solar cells and wind energy in the more developed contries or regions. In lesser developed areas, wind, animal and even human power could be utilized. Archimedes screws, shadufs, and persian wheels are just a few of the traditional irrigation methods that should be made more efficient.

Finally, we need to look at what happens to the food once it has been grown. In the U.S., little of the crop is used on site. Most is transported to a central storage area and then to a processing plant where the raw material (corn, wheat, cattle, chickens, etc.) is processed into a multitude of dried, frozen, preserved, baked, fried, and/or boiled foods. These processed foods are then placed in packages, each package colorfully decorated. Most of these processes and each of the colorful decorations require the use of energy. Much of this energy use is needless.

It is apparent that the food production system of the U.S. is grossly inefficient in terms of energy use. Yet it is a system envied around the world, one that many countries are attempting to duplicate. If they are successful, it could mean ecological catastrophe for the world's environment. Other nations and the U.S. as well must begin to seek less energy consuming alternatives. The U.S. must continue to be the leader in food production but it also must become the leader in energy efficient methods of food production.

AIAA. TH-9-10:15
FUTURE ENERGY RESOURCES. Anthony E. Schwaller, Assistant Professor, Department of Industrial Education, St. Cloud State University, St. Cloud, Minnesota.

Many types of future energy resources are currently being researched to determine their feasibility as an energy resource in the 21st century. These include such resources as wind, biomass, ocean thermal energy conversion, solar thermal electric converters, fusion, and solar cells.

In this presentation, these resources are discussed including the availability of each resource, state of technology, economic problems, and environmental considerations.

Wind energy is being studied carefully to determine its uses and feasibility in an energy hungry world. Locations of windmills, speeds of wind, types of wind generator machines, and storage of this energy are all being researched. In fact, several large projects are currently in progress providing vast amounts of knowledge to help improve the economic and environmental problems facing the use of wind generators.

A second and rather new resource called bioconversion is also being researched and investigated. Bioconversion is the process of producing energy from various organic matter such as plant life and organic waste. Biomass resources can be taken from urban and industrial waste, agricultural and forestry waste, land and fresh water energy farming, and ocean farming. It is estimated that if bioconversion resources used all of the available resources, up to 50% of of world's energy requirements could be met. Both burning of the waste as well as decaying process are being considered.

Ocean Thermal Energy Conversion, another energy resource, takes the solar heated water from large oceans and through the use of water temperature differentials passes this heat through a low speed and pressure turbine generator. In this case, the ocean is acting as a storage medium. Probably the most likely locations of these large Ocean Thermal Energy Converters would be between the Tropic of Cancer and the Tropic of Capricorn where 90% of the earth's surface is water. The power plants are being designed to take in the warm solar heated water, warm a refrigerant to a vapor, turn a turbine, and condense the vapor back to a liquid by the use of cold water from the bottom of the ocean.

Another type of indirect solar energy system, called the Solar Thermal Energy Converter, uses mirrors or heliostates to concentrate the sun's rays on a central location or boiler. Temperatures of 2000°C can be reached within the boiler. Many designs are currently being incorporated to store excess energy during nighttime hours. In order to allow efficient operation, computer networks are being designed to continually focus the sun's energy on the boiler throughout all periods of the daylight hours.

Probably the most impressive research is being done in the area of fusion. Fusion is defined as the combining atoms together to produce energy rather than that of fission or splitting of atoms. In this case, deuterium and tritium atoms (very light atom) are combined by heat to produce energy. Although temperatures of 50,000,000 degrees C or more are needed for fusion, the extracted energy when fusion occurs is even greater.

In order to produce these high temperatures, a plasma is created within a magnetic field surrounded by very low temperatures to provide superconductivity of materials. A difficult and challenging research program is still underway to produce such a power plant. If fusion does become a reality, it is estimated that all of the world's energy needs could be met by using a relatively small quantity of sea water.

Direct solar energy is also being used to convert the sun's energy directly into DC electricity by the use of solar cells or more commonly referred to as Photovoltaic cells. Photons of light energy cause an electrical charge to be developed across a junction of semiconductor material. Although costly to make and somewhat low in efficiency, new methods of mass production and new materials are bringing the cost down to a consumer level. With these new advances, more solar cells will come into use in other sectors of society including both transportation and industrial.

Other uses of solar cells are also being considered including solar roof shingles, microwave solar systems, and solar cells used in automobiles and their finishes. With these kind of advances, solar energy has a bright future.

Many different energy resources are currently being studied. As our society enters into the 21st century, much of the research done today on these resources will lead the way to more energy in the future. Not one single resource will become the ultimate answer but tapping all of these different resources becomes the solution to meeting the energy needs in our society.

AIAA. W-2:30-4:00.
THE APPROPRIATE TECHNOLOGY PERSPECTIVE APPLIED TO ENERGY EDUCATION IN INDUSTRIAL ARTS. John W. Sinn, Training Associate, Technology Education Program, West Virginia University, Morgantown, West Virginia.

The appropriate technology concept may be broadly defined as the process of examining and adjusting technologies according to the effects technology has on people, resources and environment. Thus, appropriate technology could mean evaluating technological effects and making adjustments to offset those effects.

A technological evaluation for appropriateness could be simply asking the question, "is a technology the most appropriate technology for the task at hand"? The formal process of evaluating technological application may involve values, attitudes, resources, efficiency measures, task analysis, economic factors, and much more.

Technology relies on energy for power. A major contingency in the appropriate technology concept may be energy. Thus, the appropriate technology concept generally involves making decisions about energy; sources and types, consumption efficiencies, utilization factors, costs involved in transforming and transporting, and so on.

If people are to make wise decisions about the use of energy and technology they must possess information and skills related to energy and technology. Where can people learn about information and skills necessary for making decisions concerning appropriate energy and technology use?

Industrial arts educators are general educators with unique understandings of the industrial and technological world. It may be that industrial arts educators have a responsibility to teach about the appropriate technology process as it relates to energy and other issues. Industrial arts educators could assist people in (1) understanding the need for questioning and evaluating technology and energy choices; and, (2) understanding how to accomplish the technological evaluation.

An introductory-level industrial arts energy course could provide an environment for teaching about appropriate technology. Energy, studied academically and through laboratory activities, could combine with the concept of appropriate technology for numerous learning experiences. Multiplicities of opportunities for research, problem solving, observations, construction and testing of devices, valuing, and much more could result from an industrial arts energy and appropriate technology course.

The introductory-level course could be accomplished through a three-component strategy. The three components are: acquaintance period; technological modeling; and, problem solving.

The first component introduces and overviews the total course, (1) providing a common knowledge and experience base relating to energy tools, techniques and systems evolution, current state and future projections; (2) introduces the concept of appropriate technology; and, (3) provides a developmental transition toward components II and III. Topics addressed in the acquaintance component could include: energy and appropriate technology defined; energy and appropriate technology pruposes; energy sources, systems and their evolution and future projections; energy use implications, effects and impacts on people, natural resources and the environment; conservation; values and attitudes; and, perhaps others. Hands-on activities might include exposures to past, present and future energy sources and systems (or their applications) through written activities, disassembly and reassembly of mechanical objects or other activities involving energy tools, techniques or systems and their components.

The second component, technological modeling, requires students to model an energy technology from any time period by development of a single energy tool, technique or system reproduction. The models could be full size or approximate scale and functional or non-functional. Possible devices and/or topics are accomplished either through student activities and experiences or through instructor presentations. These could be: past, present and future energy sources and systems; alternative energy sources and systems; and, energy production, conversion, transmission or use systems. Modeling activities from the appropriate technology perspective, should be selected for student pursuit based on those which are appropriate for meeting various societal and individual needs and priorities. Each technological modeling activity should be evaluated by students and instructor according to its general efficiency, technical feasibility, and economic factors, as well as the effects noted on resources, environment and people, resulting from the energy technology. During component II, as with the other components, pertinent and appropriate technology related discussions, presentations, demonstrations, group sharing activities and experiences, and library resources assignments and use; will be undertaken, for student horizon broadening.

The third component, problem solving, is the culmination of all past course information, activities and experiences. Students, as individuals or in small groups, will identify a problem related to current energy technology, plan a means to resolve the problem, and pursue the plan within the course time remaining. Problem areas to be encouraged could be: pollution; natural resources use/abuse; energy production, conversion, transmission, utilization or efficiencies; alternatives; social problems; environmental problems; energy costs; values and attitudes; and, perhaps others. Methods for dealing with problems might include library research, visitations, surveys, observations, experimentation and construction of a device. Appropriate technology factors to be considered during the problem solving component could be: task analyses; technological and problem assessments; values; available resources; economic variables; transformation and transportation factors; efficiency measures; moral and ethical considerations; social considerations; and, perhaps others. Regarding the evaluation of problems, it should suffice to ask: what effects on resources, environment and people have been addressed by the problem solved? Put another way, the evaluation could seek to answer the question: why is the solution presented in the problem solved any more appropriate than the circumstances which created the need for the problem solving?

EVALUATION

AIAA. T-9:00-13

STANDARDIZED TESTING IN INDUSTRIAL ARTS: A NATIONAL STUDENT EXAM?

Michael J. Dyrenfurth, associate professor, Industrial Education, University of Missouri-Columbia.

Many of the influences that impinge on today's educational system also have implications for industrial arts and the specific topic of standardized testing. Perhaps the most pervasive of these forces include the competency based education thrust and the profession's increasing concern for control of its destiny. The former causes us to want to be able to document our impact on students, the second to insure that the public is aware of our contributions. Other influences such as growing basic skills movement, the industrial arts teacher certification issue, the National Teachers Examination, and the federally mandated (PL 94-482) program evaluation also impact with related efforts.

The outgrowths of such influences are as varied and multi-faceted as the forces themselves. One effect is a call for a standardized way of comparing the effects of varied instructional approaches. Another outcome is a desire for a parallel to the Scholastic Aptitude Tests. Such instruments would also lend themselves to advanced placement functions that could prove valuable to college-bound industrial arts students, particularly with the increasing inclusion of technology and culture explorations in university and college general education cores.

Calls to action are also generated by both PL 94-482 (Education Amendments of 1976) and PL 94-142 (Education of All Handicapped Children Act). The former's program evaluation requirement becomes increasingly important as greater numbers of industrial arts programs receive federal financial support. Since industrial arts does not necessarily seek to measure its performance on the basis of job placement, measures of student knowledge gain will play a large role in program evaluation. Such measures also lend themselves to diagnostic and research purposes. The diagnostics may prove helpful to schools as they work towards the least restrictive environment goals for all students.

Projected Instrument Characteristics

Given the preceding influences, forces and implications, it seems useful to approach standardized testing as one way of addressing the existing needs. The following list could characterize some basic requirements for a defensible evaluation program:

1. The instruments must be accepted by the profession.
2. The instruments must meet high standards of reliability and validity.
3. The instruments must be keyed to the generally accepted objectives of the industrial arts profession. Test specifications, in terms of both domains and levels, must be congruent with industrial arts' objectives.
4. Test items must deal with what represents a mutuality of content as addressed across the nation.
5. The instruments must be sympathetic to and reinforcing of ideas that represent trends and/or cutting edges of the profession's development.

6. The instruments should provide readouts as to both overall and subscore performance. Mastery of the discipline's base of knowledge, skills and attitude would represent the general score. Subscores possible might include:
    a. any specific technological unit and/or cluster
    b. avocational interests
    c. career maturity
    d. consumer awareness
    e. technological literacy
7. The instruments should include provisions for immediate (local) feedback as well as detailed analysis and interpretation. Related characteristics should include:
    a. low-cost scoring and analysis
    b. quick turnarounds
    c. parallel forms
    d. some portionability to allow instrument "tailoring"

Desirable Implementation Characteristics

Paramount among the desired characteristics is the proposed instrument's acceptability to the profession. Essentially this requires a good measure of professional control.

In terms of staff, time or expertise, the profession's single voice, the AIAA, is simply not geared up to providing the services required by a national standardized testing program. Furthermore, it may even be desirable to maintain some form of distinction between the standardized testing program and the advocacy group that the AIAA has become.

What then is the best way to proceed? Well, one of the alternative routes would suggest that the AIAA establish a board to monitor and promote our profession's standardized evaluation procedures. This board of teachers, administrators, researchers and evaluation specialists would develop an initial set of program specifications. These specifications would serve as the basis for consultations with testing agencies with an in-place development capability. The ensuing liaisons would ultimately lead to an AIAA contract with one agency.

Subsequently the selected agency and the AIAA's professional evaluation board would proceed through the test development cycle of specification, validation, and norming. After appropriate field testing, both agencies would participate in dissemination as needed to ensure widespread adoption of the instruments.

Summary

Quite simply, this observer believes that it is imperative that our profession gains control over some of the key influences that affect our destiny. Standardized testing is one of these forces. The profession board-testing agency liaison is a mechanism that has served other professions well. In a similar manner, industrial arts is in a position to seek and achieve equivalent benefits.

(Full versions of this paper complete with references are available from the author upon request).

FUTUROLOGY

AIAA TH-3:00-3

THE FUTURE OF EDUCATION.

Sandra Ann Angelo
Industrial Education, Purdue University, W. Lafayette, IN.

Developing a futuristic program for industrial arts requires that the entire spectrum of education and where it is headed be examined. One exploratory method in accomplishing this is trend extrapolation. Through trends, a scenario is presented suggesting where education is headed and some of the problems to be faced.

The Seven Cardinal Principles of Education were published in 1918. These principles, today and in the future, are still valid. Interpretations of these principles must be modified to meet the goals and expectations of the future.

Health-Pupils need to know how to survive in a carcinogenic society. They must also understand the causes of cardiac illness, and the importance of mental health practices. They must also have an understanding of healthful living.

Command of Fundamental Processes-Fundamental processes include the three "R's". They also involve human relation skills, the development of cross-cultural insights, a knowledge of sources, an understanding of computer languages, the ability to cope with increasing complexity and the development of "anticipatory skills".

Worthy Use of Leisure-People have more time available to them as technology advances. Students need to learn to make this time productive and worthwhile.

Worthy Home Membership-As the structure of the family changes, students need to learn how to cope with these changes.

Vocational Competence-A good general education is the best prerequisite to vocational skills. Occupational education must not lock people into the wrong jobs. Along the same line, retraining should be available for those who want to look to a new occupational or career area.

Citizenship Skills-A need exists to study and improve the inequalities existing between the have and have not worlds. The young need to be introduced to ways of making positive use of power and the need for people to be better informed when they seek to exercise that power.

Ethical Character-This developmental principle includes 1) the need to recognize the value of self discipline in learning; 2) the merit of rules to live by as distinct from unrestrictive permissiveness; and 3) a concern for the environment as evidenced by a realization of the importance of protecting and improving the biosphere.

Looking to the future, the following certainties exist. Runaway Inflation; Changing Workforce; Accelerated Change; Increased Complexity; Twilight of Hydrocarbon Era; Continual Crowding and Hunger; Third World Pressures for Equity; Troubled International Waters; Welfare, Debt, and Freedom; Future Directed Planning.

In order to deal with these inevitabilities, individuals need coping skills, caring and communication. The educational system should be restructured to meet these needs.

Additionally, we are heading towards a "Leisure Society". In a leisure society, 2% of the population will be able to provide all necessary goods and services. Traditionally work defines our lives. If 98% of us don't need to work, what are we to do? Something other than work must be found to determine both income and meaning in life--or 98% of us could be both hungry and frustrated. In a leisure society most of a person's time would belong to that individual. Increased leisure often generates domestic conflict or withdrawal. Education in such a society must result in a change of the present values of individuals. This will be necessary in the future if individuals are to be able to cope.

Technology and social change is outracing the education system, and social reality is transforming itself more rapidly than our educational images of that reality. All too often students are taught only the products of earlier innovation rather than teaching how to innovate. Minds are treated as storehouses to be filled rather than instruments to be used. We can no longer teach selected skills. We must instead teach students to think and to learn basic skills that can be applied to all aspects of living. The world of the future will require more flexibility in the way we schedule education, work, and leisure over a person's lifetime. If this can be done successfully through a cyclic life plan, the way will be open for each individual to realize many personal dreams.

Many of the goals of change may be accomplished through industrial arts. Industrial arts has a vital role to play in the future educational system, but, it can not be known by the title Industrial Arts. The continued use of the term ignores that society is now in a post-industrial era. It is recommended that the industrial arts profession change its name to "Eco-technology Education" to reflect cultural reality. Eco-technology education will become interdisciplinary in nature encompassing all traditional areas of education today. The interdependance of eco-technology education will result in better reading, math, and language arts skills. Because it's practical applications are so evident, student motivation will be increased. Emphasis in eco-technology education will be on developmental tasks. Personal development will result in the acquisition of the idealistic goals of education. Curriculum will be very broad. The instructor will be a resource person and the laboratory and classroom will not be confined to any one area. Different methods of information transfer will be implemented. Greater emphasis will be placed on problem solving skills and abilities, as well as the individual and coping in a post industrial, highly technical society. Specific vocational skills will no longer be emphasized, and productive use of leisure time will be encouraged. Eco-technology education will not be limited to a small segment of the population. Instead it will be available to all segments of the population for a lifetime.

AIAA. T-1:00-6

THE FUTURE ROLE OF INDUSTRIAL ARTS.

Glen O. Fuglsby, Ph.D., Professor
Department of Industrial Education & Technology, Eastern Washington University, Cheney, Washington 99004

In one aborigine tribe, a male youth becomes an adult if he can survive a six-month long endurance test alone in the wilderness. This is his "walk-about", and, if he is to survive, he must possess the necessary skills for survival or else he will die in this attempt.

All young people must face their walk-about. They must survive the transition from youth to adult life. Although the penalty for failure in this walk-about is not as severe as for the aborigine youth, there are failures and society has the obligation to ensure success.

Our educational system must accept its share of the obligation to assist young people in learning the necessary survival skills so that they can successfully survive the transition from youth to adult life. In addition, their survival skills must be applicable to the future.

In the book "Curriculum Change Toward the 21st Century", the author summarizes the informed opinions of over 40 selected, knowledgeable individuals representing varied walks of life, including foreign nationals, on the role of education. Those interviewed re-interpreted the seven cardinal principles of education in anticipation of the 21st century and affirmed these principles as the goals for all ecudation. (See chart)

How can industrial arts contribute to these goals? Is there a unique role that this discipline can play? The answer is definitely positive. We have been successful in the past, providing an excellent base for developing a program to meet future needs. It may mean that the goal for industrial arts will need to be re-stated. This discipline must zero in on one, or at the most, two, goal statements. With the goals for all of education stated in the seven principles and considering our present programs, the goal for industrial arts can be simply stated as:

> "The goal of Industrial Arts is to teach our students to think and to act, augmented by tools and machines, materials and processes, energy and communications, to meet their present and future needs and to extend their potential."

In addition, our teaching method must emphasize "learning how to learn". This is crucial since our students must be prepared to face the future. They must know how to learn to use new materials, new tools, machines, etc. If we are successful in teaching our students to learn how to learn about present materials, for example, this method hopefully will transfer to future materials utilization.

The chart on the next page is an example of how a series of classes which utilize fibrous materials, such as wood, can be planned to assist in meeting the seven goals of education. The four levels represent the initial contact with a student to more advanced classes.

Surviving the transition from youth to adult life and living in the 21st century is the goal. Industrial Arts has a unique role - a new horizon.

The goal of Industrial Arts is to teach our students to think and to act, augmented by tools and machines, materials and processes, energy, and communications, to meet their present and future needs and to extend their potential.

OBJECTIVES - WOODS AREA

SEVEN GENERAL AREAS(*a) FOR ALL EDUCATION	LEVEL ONE(*b) OBJECTIVES TEACHER GENERATED	LEVEL TWO OBJECTIVES TEACHER ASSISTED	LEVEL THREE OBJECTIVES STUDENT INITIATED	LEVEL FOUR OBJECTIVES STUDENT MANAGED
HEALTH & SAFETY	The student will learn and follow the woods laboratory safety rules and health procedures.	The student will identify safe and unsafe acts in the woods laboratory as they relate to himself/herself and others.	The student will identify, analyze, and propose solutions for unsafe and unhealthy situations in the woods laboratory.	The student will develop and assist in the enforcement of safe and healthy living procedures.
FUNDAMENTAL PROCESSES	The student will apply and extend educational skills in learning wood related skills and technology.	The student will apply and extend educational skills and wood related technology in meeting his/her needs and wants.	The student will develop and apply problem/solution techniques using educational skills and wood related technology.	The student will use educational skills and wood related technology to identify research, and solve his/her problems.
FAMILY MEMBERSHIP	The student will use wood related technology that is commonly used in the home environment.	The student will identify needs and wants in the home, which may be met by woods related technology.	The student will select wood related tools, machines, materials and products which will be appropriate for his/her home situation. (Consumerism)	The student will analyze home needs and develop solutions using wood related technology.
VOCATION	1. The student will identify industrial and technical careers which are related to the woodworking industries. 2. The student will produce products using wood related technology.	1. The student will select and assess wood related occupations of interest to him/her. 2. The student will role play a mass production process experiencing the role of a producer of products or services in a free-enterprise system. 3. The student will produce products using wood related technology.	1. The student will identify entry level skills for the selected wood related occupations. 2. The student will produce products using wood related technology. 3. The student will develop a positive attitude toward work and an appreciation of quality wood products.	1. The student will identify wood related occupations entry level work skills and compare with his/her work skills. 2. Students will develop a career action plan in order to prepare for their next career step. 3. The student will develop skills in the design and fabrication of quality wood products.
CIVIC EDUCATION	The student will be responsible for his/her acts as they relate to others in the woods laboratory.	The student will share in the use of wood related technology in the laboratory with classmates.	The student will participate as a member of a group in using wood related technology to meet a common goal.	The student will develop means of sharing his/her technical skills and knowledge in meeting common needs or wants.
LEISURE	The student will use wood related technology that is appropriate for leisure activities.	The student will identify wood related leisure time activities of interest to him/her.	The student will investigate and analyze one leisure-time related activity of interest to him/her.	The student will use wood related technology in a leisure time activity.
ETHICAL CHARACTER	1. The student will use the woods laboratory equipment and material appropriately. (Respect for public property.)	2. The student will assist his/her classmates in the care and protection of their projects. (Respect for the property of others.)	The student will keep a record of materials used in the production processes, figure the costs, and pay those costs assigned.	The student will examine his/her work and evaluate in terms of his/her capabilities.

(*a) The seven cardinal principles for all education, which have been up-dated for the 21st Centuru.

(*b) The levels represent a continuum of experiences from the introductory to the advanced.

(c) Technology is defined as the application of knowledge to meeting our needs and wants.

AIAA. TU-3:00-11

INDUSTRIAL ARTS/TECHNOLOGY - A STRATEGY FOR CHANGE.

James Hales, Director, Division of Technology, Fairmont State College, Fairmont, West Virginia; James Snyder, Curriculum Specialist, West Virginia Department of Education, Charleston, West Virginia.

It seems appropriate, with the theme of the conference as it is, to attempt to establish a basis for the content area of our profession. It is generally accepted that we are living in a technological society which is global in nature. The composite is a complex arrangement of systems - social, political, economic, technical and humanistic. These systems in turn interact one upon the other affecting the life style of every individual on earth. A few distinguishing characteristics of the technological society are that it is global, electronic, insecure, energy consuming, technologically illiterate, quantitative, etc.

It is also generally accepted that general education may be considered as perpetuating a way of life. Thus, education as a Life Activity is basic to our society. Education is responsible for providing experience to fill the voids of each learner and to provide for knowledge and reason. From these experiences, the learner should receive the basic skills for decision making and coping with change. These skills will assist the learner when deciding on careers or changing careers; when faced with drastic decision as a consumer; when faced with community/public issues; and during the realization of a need for continuing education. The decisions that are made as a result of these experiences can determine the life style of the learners. Based upon the learners changing needs and the willingness to pursue additional education that life style may change. Recreation, a fifth element of a learners life activity, also will be a product of the individuals experiences and/or the level of life style the person is holding, at any given time.

So it is that industrial arts finds its relationship to general education, and it is our responsibility to redirect our content base away from the province of other disciplines. We must return once again to our role as reflecting the nature of our society as a part of general education.

The point of this discussion is that in our technological world we have social, economic, political, humanistic and technical concerns which must be integrated with the learners education for life's activities. These elements must have a unity and the learner must have an understanding that allows for acceptance or change in one's life. These are the "things" that are basic in education. These are also the "things" that make the area of industrial arts basic in the educational curriculum.

This then leads us to a curriculum model for a technological world and a Strategy For Change. In response to the competency testing tide that has swept the nation, the West Virginia Department of Education decided to pursue the route of developing Essential Competencies/Learner Outcomes (ECLO's). The format is a constant in as much as concept, essential competency, and learner outcomes must be specifically stated. The term concept is defined as inference based upon a sample(s) of a learner's behavior; essential competency is a statement which describes what the learner will perform as a result of an instructional sequence of learning activities; and learner outcome describes the knowledge, values, and psychomotor skills which facilitate mastery of the essential competencies. It must also be stated that the essential competency is an overall objective consisting of a learner term, process or performance term and a content statement.

To pursue the concepts for the elementary school levels, a process was developed to solicit input from a broad base of educators. This process identifies the activities and sequence to arrive at finished ECLO's.

Concurrent with the development of the ECLO's, another committee is developing a curriculum package which will consist of 1) a position paper on industrial arts and technology, 2) a public relations brochure for administrators, 3) school level curriculum syllibi, and 4) the ECLO's. This total package is being developed to be approved by the West Virginia Board of Education as a change model for industrial arts curriculum.

ACIATE. TH-2:00-1
FUTURES WORKSHOP. Gary Lintereur, Assistant Professor, Dept. of Industry and Technology, Northern Illinois University, DeKalb, Illinois; Rex Pershing, Associate Professor, Dept. of Industrial Technology, University of Northern Iowa, Cedar Falls, Iowa; Lee Smalley, Professor, Dept. of Industrial Teacher Education, University of Wisconsin-Stout, Menomonie, Wisconsin

The Futures Workshop, for the second consecutive year, is limited to twenty five participants so that hands-on activities can be experienced. Following is the sequence of the topics and activities:

2:00-2:20 - Introduction, handouts, overview

2:20-3:00 - History of futures, first round of Delphi, future wheel.
- Concepts of the future:
  (1) You must have a vision.
  (2) Everyone is a futurist.
  (3) The future is lurking in the present.
  (4) Design possible future alternative.
  (5) Develop a future screen.
- Modes of thinking: past, analysis mode, what went wrong; present, reaction mode, what is wrong, future, synthesis mode, how to make it go right.

3:00-3:45 - Examples of classroom activities, second round of Delphi, present status of future studies.

3:45-4:00 - Break

4:00-4:30 - Write scenarios, third round of Delphi, alternative futures for industrial arts.

4:30-5:00 - Results of Delphi, feedback, evaluation.
- History and future of mankind in one minute, twenty seconds: The Desert, pre-historic man among resources but not able to use them; The Fertile Valley, agricultural era where man could survive; The Greenhouse, the industrial revolution provided an environment and material things to prosper; The Cliff, the present provides us with seemingly insurmountable problems; The Garden of Eden, technology will allow us to scale the cliff and find the promised land.

Participants actively get involved in various forecasting techniques. The first technique examined is the Delphi. Simply defined, the Delphi is a decision making tool involving a series of structured questionnaires aimed at obtaining consensus regarding a specific event or outcome in the future. In Round I of the Delphi, workshop participants are asked to identify 5-10 events that could happen by the year 2000 in Industrial Arts. In this simple Delphi we are interested in obtaining data regarding which events are identified most frequently and which events the participants feel should be enhanced or inhibited.

The five events which are identified most frequently become Round II of the Delphi in which the workshop participants are asked to rate the desirability of each event actually coming to fruition. A value rating of 1 is undesirable and 10 indicates very desirable. This data is collated and the median rating is determined for each event.

In Round III of the Delphi each participant is asked to evaluate his rating against the group median. They are given time to reflect for a few minutes on those events where their value rating varies greatly from the group median. They complete Round III by resubmitting value ratings for each event. This data is collated and varying degrees of consensus are obtained regarding the desirability/undesirability of each event.

While conducting each round of the Delphi, workshop participants are informed about the mechanics, advantages, disadvantages, and uses of the Delphi technique. The workshop Delphi becomes a point of departure for discussion regarding "Alternative Futures for Industrial Arts."

Workshop participants also break into groups of three or four and construct a futures wheel. This technique is extremely useful for identifying first order, second order, and successive order impacts of an event. What would the impact be if we were to require Industrial Arts for all boys and girls at the seventh and eighth grade level? We put this event in the center of a piece of paper as the "hub" of the wheel and then start branching off the impacts of this event. As the wheel takes shape participants soon see that an event does not just happen independent of other variables in the system or support system of that event. In the example given above, everything from increased class size, greater technological literacy, more teachers needed to more females teaching industrial arts, is identified. This technique is very effective for classroom use to make students aware of the impact of a new technology.

This workshop is presented as part of the ACIATE Study of the Future Committee's goal of helping instructors futurize their courses. Participant evaluation of the workshop has been most encouraging. In a discipline that boasts of hands-on experience, and taking something home of value, this workshop leaves no theory/practice gap.

If it is a truism that education is to help individuals live in the future, rather than the past, then it is paramount that all educators, not only industrial arts educators, become future oriented. Futurism does have a place in almost every industrial arts course taught. The Study of the Future Committee has over 100 members, and a subcommittee network to help any interested instructor futurize their course.

GRAPHIC COMMUNICATIONS

AIAA Th-3:00-4

IOWA INDUSTRIAL ARTS CURRICULUM PROJECT. Harold Berryhill, State Industrial Arts Consultant, Elementary Secondary Services, Department of Public Instruction, Des Moines, Iowa.

In 1973 the Department of Public Instruction funded the writing of a new State Guide in Industrial Arts that emphasizes career education and industrial technology as criteria for what should be taught in industrial arts. Content is organized around three cluster areas: Energy and Power, Graphic Communications, and Production. It suggests that activities to be used that emphasize concepts of Energy and Power, Graphic Communications, Production, and Career Opportunities rather than projects that teach only hand skills. Teacher teams and university staff created this guide.

The guide, "The Iowa Guide for Curriculum Improvement in Industrial Arts, K-12," was printed in the summer of 1975. It was disseminated during the 1975-76 school year via inservice facilitated by Area Education Agencies. Sixty-eight (68) percent of the Iowa industrial arts teachers received the guide in this way.

In the summer of 1976 teacher teams were assembled, one each at Iowa State University and University of Northern Iowa to begin writing handbooks in the cluster areas of Graphic Communications and Energy and Power. Activities created were tested during the 1976-77 school year and finalized the following summer. A third team began in the summer of 1977 in the cluster area of Production and finalized that handbook in the summer of 1978. The Energy and Power and Graphic Communications handbooks have been printed and the Production handbook is about ready for printing. The handbooks deal with entry level industrial arts courses (middle or junior high school).

Eleven sites in nine school districts are implementing these handbooks in a pilot program project this year. (Exemplary monies)

Implementation following the exemplary project, open to all Iowa schools, will require vocational program monies. The Industrial Arts Cadre* is requesting $150,000 of vocational program monies to provide a resource to 30 schools to implement the new entry level Industrial Arts in the 1979-80 school year.

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*The Industrial Arts Cadre (Curriculum Project Committee) is a group of teachers, university teachers, and the DPI consultant that meet monthly and make periodic recommendations to the Director of Career Education in terms of a Master Plan and then facilitate the approved Master Plan.

FUNDING INDUSTRIAL ARTS

PROGRAM IMPLEMENTATION:

	'80	'81	'82	'83	'84
Entry Level	150,000	250,000	300,000	300,000	250,000
High School			50,000	200,000	250,000
TOTALS	150,000	250,000	350,000	500,000	500,000

CURRICULUM DEVELOPMENT:

	'80	'81	'82	'83	'84
High School	25,000	25,000			
Modification	10,000	10,000	10,000	10,000	10,000
Elementary	?	?	?	?	?
Inservice	6,000	7,000	8,000	8,000	8,000
Project Committee	6,000	7,000	8,000	8,000	8,000
Printing	10,000	10,000	10,000	10,000	10,000
TOTALS	57,000	59,000	36,000	36,000	36,000

This summary reflects Cadre recommendation, IIEA/SCIATE (Jan. '78) hearing input and DPI consultant's perspective as of this date, 12/10/78.

AIAA Th-3:00-4

GRAPHIC COMMUNICATIONS CURRICULUM PROJECT. Ray D. Loyd, Undergraduate Coordinator, Department of Industrial Education, Iowa State University, Ames, Iowa.

Graphic communications is a cluster of study involving personnel, systems, and techniques in communicating ideas, knowledges, and information for the production and servicing of industrial goods. Graphic communications encompasses all the content of drafting, design, printing, photography, and graphic arts, as well as other graphic reproduction processes used by business and industry. Graphic communications is but one form of the communication system. Using this definition, graphic communications has been recognized as a viable cluster organizer for industrial arts at the junior high level.

To facilitate acceptance of clustering, a group of content organizers were developed. An organizational model was devised which serves as an alternative to traditional course structuring. The cluster is divided into four major areas. Each area is a grouping of conceptually similar processes within the cluster. A representation of the model is depicted in Figure 1.

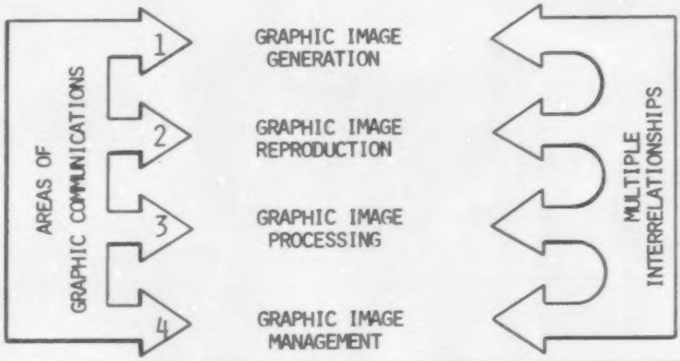


FIGURE 1. GRAPHIC COMMUNICATIONS MODEL

Graphic image generation is the area which covers every step of generating the original image of the message to be conveyed. From conceptualization in the early design stages, to finite copy preparation, all forms of design, drafting, composition, layout and paste-up operations are included in this area.

Graphic image reproduction includes every phase of converting the original message into a mass communique for distribution. This area covers everything from process photography to office duplication methods.

All bindery operations are covered in the graphic image processing area. Each phase from collection of reproduced material through the labeling of packaged material is important in preparing reproduced graphic messages for distribution.

Any of the manual or automatic coding and filing systems used by industry to store reproduced messages and retrieve them for future use are considered as graphic image management. Whether in a computer bank, or microfilm, or on a library shelf, the message can be stored for easy recall.

The major goals of the Iowa exploratory graphic communications program in the junior high school level have been identified through graphic communications institutes. These goals were assessed using the professional opinion of members of an innovative cadre made up of teachers, administrators, and consultants; and the participants in the graphic communications institutes. Following is a list of the goals ranked in priority order:

Goal 1.0 - To provide opportunities for students to broaden career awareness through exploration of graphic communications.
Goal 2.0 - To provide opportunities for students to explore graphic communications materials and processes.
Goal 3.0 - To provide opportunities for students to improve problem-solving and creative abilities through graphic communications.
Goal 4.0 - To provide opportunities for students to develop safe working habits in graphic communications.
Goal 5.0 - To provide opportunities for students to understand the implications of graphic communications on society.
Goal 6.0 - To provide opportunities for students to understand the total structure of graphic communications technology.

Activities were developed to effectively present the concepts, attain the major goals, and to synthesize the total graphic communications system. Specific performance objectives were included to provide a measurable outcome useful in evaluating the project. This assemblage of graphic communication curriculum material was published as the Iowa Industrial Arts Handbook for Introductory Level Graphic Communications.

The Handbook material is currently being tested in pilot programs which will eventually become exemplary programs for the state. The many factors influencing program development are so great and diverse that the task would be an impossibility for one classroom teacher to accomplish. In a joint effort, the task was made easier; content was more easily identified and organized, interrelationships became more visible and the cooperation provided a cohesiveness in personnel. With continued and cooperative efforts, the classroom teacher in Iowa will be able to remain abreast of new developments and to maintain a relevant program in graphic communications.

INDIVIDUALIZED INSTRUCTION

AIAA. TU-3-4:30

COMPUTER-MANAGED INSTRUCTIONAL DELIVERY IN INDUSTRIAL ARTS.

Edward E. Boas, Jr., DELTA Project Leader, Department of Educational Development, University of Delaware, Newark, Delaware.

Need and Problem Area. This research on CMI developed from a concern of how individualized instruction was delivered in an individualized program curricula. The initial idea was researched at the University of Delaware and found no examples of computer-managed instruction that prescribed, delivered, and recorded results of individualized instructional modules of instruction.

Purpose. The main purpose of this research was to examine the instructional strategies which are most effective for a group of students. Characteristics, such as reading and grade levels are compared in terms of student achievement of a criterion stated objective delivered by three different instructional techniques; namely, teacher-lecture, teacher-module (paper), and computer-managed instructional delivery.

Specific Objective. The major student objective was: using three instructional delivery techniques, which will best assist students at varied reading and grade levels to achieve a stated criterion referenced terminal performance objective?

Methodology. Through the University of Delaware, Department of Occupational Education, in September 1976 a computer-managed instructional delivery and management recording program was developed. Next, a module of instruction was developed that could be delivered via the CMI system. After field testing the module, a population was identified to test the delivery of the module and test the CMI system instructional technique with other identified instructional techniques.

The module developed and used in this research was on reading micrometer measurements. This competency was selected because each instructor in the identified population, included a reading micrometer measurement competency in their curriculum.

Instrumentation. Three instructional techniques (treatments) were delivered to the three grade levels and four reading levels grouped across each instructional technique.

Data Source and Sampling Design. The sample population consisted of 202 students in related drafting classes at Delcastle Technical High School in Newport, Delaware. Content for each instructional module was limited to instruction on reading micrometer measurements using three instructional delivery techniques that would be implemented and data gathered.

Findings and Conclusions. Findings support evidence indicating that student achievement was highest with those students who received the computer-managed instruction. However, the evidence and related literature available for student achievement and instructional delivery techniques that include CMI as designed in this research are not readily available. The analysis of results among the three grade levels, four reading levels, and student achievement indicated the relationship of the teacher-lecture instructional delivery and student achievement was not significant. Achievement scores for those who had the teacher-module and achievement was highest with students who received the CMI module of instruction for all reading and grade levels. The developed and implemented computer-managed instructional delivery could be used to deliver most types of individualized instruction and adapting computer resources to existing curricula in the classroom. Implementing this type of computer-managed delivery is not that difficult, and the ability to adapt most curricula material to this format can be completed in a minimum amount of time. The real reward is when editing and updates are needed to the curriculum information, it becomes very easy and quick for the instructor and provides students with up-to-date, pertinent materials.

There is evidence to support that other areas of research using CMI, such as reading level and the ability of students, IQ, student achievement, student selected scheduled individualized instruction, are just a few in which the effectiveness and potential of CMI systems could be researched.

Educational Implications. Results indicate that a viable computer-managed delivery system for individualizing instruction can be developed and implemented successfully. Although the use of the computer-managed system in this research was limited to a relatively small number of students, it does serve as a model for other curriculum developers and administrators to emulate in providing career exploration experiences, job entry competencies, and other competency oriented individualized instruction for students at the secondary school level. This research demonstrated that it is feasible to develop a computer-managed instruction system that could individualize instruction for students and provide record-keeping services to instructors and students.

Computer-managed instructional (CMI) delivery has much potential for the future. Research needs to be conducted on the effect CMI will have on training students in higher education, the levels that CMI are most effective and feasible, the relationships to personnel, facilities and other elements of education and industry. These can become the rationale for much future research in this area of curriculum delivery and delivery of individualized instruction.

The potential of CMI systems at all levels and in many areas appears to have a promising future and advantages for students, teachers, and administrators. Its growth is evident with the technology and current development of the computer technology and curriculum needs. This author plans to continue research with CMI systems at all levels and examine the future directions and possibilities of the computer and its role in the management and delivery of educational curricula and information.

AIAA Th-1-2:30

PRODUCTION SYSTEMS: A CULMINATING EXPERIENCE
(With Adaptations For Secondary Education)

David Bradley, Nathan Brubaker, Anthony Korwin, Mark Rogstad-Eastern Illinois University senior Technology Education students.

We believe that Production Systems should be required at the college level and be offered to secondary schools. Here, Production Systems will be described and rationalized.

To start with, we will go into the aspect of problem solving. Production Systems is a class at Eastern Illinois University that is only offered to seniors or students with senior status. This is to bring forth a culminating experience of prerequisite courses.

The course itself was centered around a difficult project providing challenges in problem solving. The responsibility and problems were spread equally amoung all students in the class. To make sure that each class has the same intensity of problems, there is always a different product. This also means that the course is never stagnant. To insure that the course doesn't stagnate, the instructor has the product made from different materials as well as introducing new problems in the transportation system. This gives the student a chance to adapt skills where he or she can relate to changes in society as they relate to the three basic areas (i.e. material and processes, power, communications).

This environment of tasks offers a framework for approaching two major objectives. The first is to incorporate and interrelate the basic technical areas. The second task is to develop an understanding of industry and technology in today's world. All types of skills and knowledge are necessary for a manufacturing enterprise. To actually see and experience this interrelationship not only sharpens a student's personal skills but also develops skill and understanding of areas the learner may not have experenced before.

The class employs a book which uses the conceptual approach to teaching. The students are in charge of giving the lesson. The lessons are taught as if they were to be given to a high school class.

While all this is going on the students are developing an understanding of industry and technology. Some of the ways this is done is to elect management personel and form a corporation. Using a modified management model with a President, Project Engineer, Marketing head, Reaserch and Development head, and Production head, the students not only do they go through the formality of starting a corperation, they also have to dissolve it after the production run and all the stock is redeemed.

Pricing of the product in our class, though it was not geared for profits because we are a state funded educational institution, so we price the product after a cost analysis only to reinburse direct material and machine cost. This way outside funds are not needed.

When pricing is done students learn the effect it has on competition and wages. It is at this time the union must be recognized. A union is set up in the class to support the worker in contract negotiations. Here the student learns the effect of unions, strikes, and arbitration because of "hands on" experience.

Effects within the class were that it brought together a variety of people for a common purpose. A class where members were known to be separate and not always compatible, join together for a common goal. This was perhaps the most important effect learned.

Finally, the social-cultural effects learned in Production Systems are an important aspect of the course. Social-cultural affects result in repercussions and implications of technology on society. Conceptual and concrete affects range from ecology and pollution to worker displacement. When Marketing did their market analysis on a suitable product, they looked for ones that would have desirable effects on a current market.

AIAA Th-3:00-4

PRODUCTION SYSTEMS. Donald R. Darrow, Assistant Professor, University of Northern Iowa, Cedar Falls; Douglas T. Pine, Associate Professor, Kentucky State University, Frankfort; Robert Warrington, Junior High Production Systems Teacher, Anamosa Community Schools, Anamosa, Iowa.

The Iowa Guide for Curriculum Improvement in Industrial Arts, K-12 was designed to establish a contemporary framework for curriculum development at the local classroom level. As such, the guide avoided prescribing specific content and methodology. A series of teacher-developed handbooks has been developed as an extension of the guide to provide local classroom teachers with a workable set of instructional materials from which they can develop their own more contemporary programs. This report describes the development of the junior high handbook in the area of production.

The First Production Institute. The first Production Institute was conducted during the summer of 1977. Fifteen junior high school teachers with a wide range of teaching experience were enrolled in the institute for a period of four weeks.

The initial charge to the institute from the Iowa Industrial Arts Cadre was to do the following: (1) to develop a one-semester comprehensive introductory course in *Production Technology* appropriate for the junior high or middle school levels; (2) to develop appropriate instructional materials which could be used as a total course package *or* implemented as selected units; (3) to include a balanced representation of manufacturing and construction activities, seeking to emphasize the commonalities of the two areas where possible; (4) to develop an instructional handbook with instructional materials consistent with the State Guide and Cadre Guidelines; (5) to develop instructional materials which could easily be adapted for use in a variety of instructional settings--large group, small group, individualized, teacher directed or student directed; and (6) to implement and test the instructional materials in a variety of classroom settings.

The one-semester course was to serve as *the minimum* recommended course offering in production for schools where it was not feasible to offer separate courses in manufacturing and construction as recommended in the State Guide. In addition, units and activities were to present and demonstrate the basic systems of production. Activities were to maintain an emphasis on student activity, not teacher talk. The activities were to emphasize career concepts, a major theme of the Iowa Guide, and to stress an appropriate balance of cognitive, affective and psychomotor learning. Management concepts were to be emphasized, and contemporary methodology as well as contemporary content was to be employed.

Group process techniques were used extensively to accomplish this charge. Participants worked in small groups on specific tasks and then presented their findings to the larger group for further discussion and decision making.

The developmental process during the workshop involved the following general tasks: (1) a review of the State Guide; (2) extensive review of available theoretical models and instructional materials related to manufacturing and construction; (3) the synthesis of a *Production Systems Model* upon which to base the handbook; (4) the delineation of course goals; (5) trial and participation in a variety of teaching strategies such as the development and use of educational games, and role playing; (6) developing a course timeline and apportioning the amount of time devoted to various aspects of the Production Systems Model; (7) reviewing the use of developmental objectives; (8) review of Cadre Guidelines relative to the instructional materials format; (9) generating ideas for student activities, and (10) writing the instructional packets.

The Production Systems Model. Development of the *Production Systems Model* was a key element in the overall process. The model development process caused participants to analyze carefully existing contemporary curricular models, and it challenged them to search for those elements which were *universal* (the most important and all inclusive elements of all production activities). The process caused participants to identify elements which were relatively *stable* (unchanging). In addition, the process caused participants to uncover a variety of alternatives, to *simplify* complex ideas, and to identify a *body of concepts* which could be studied at any level of specificity.

After developing and discussing several models, institute participants decided upon a model which included ten subsystems. Essentially, the first subsystem relates to *inputs;* the second through ninth subsystems relate to *processes* and the last subsystem relates to *outputs.* The ten subsystems are as follows: (1) Resources; (2) Management; (3) Material Processing; (4) Power; (5) Communication; (6) Personnel; (7) Transportation; (8) Marketing; (9) Finance; and (10) Goods/Services/By-Products. These subsystems, when expanded, comprised the basic elements from which instructional materials for the handbook were developed.

The Production Systems Handbook (first edition). The course design for the first edition of the handbook was comprised of two sections: an *analysis* section and a *synthesis* section. The *analysis* section was devoted to an analysis of each of the ten subsystems of the Production Systems Model during the first nine weeks of the semester. Time allocations for each subsystem ranged from 2 days for subsystems such as Finance, Transportation, Power and Communication, to 18 days for Material Processing. The *synthesis* section of the course contained three sections: Manufacturing Enterprise, Construction Enterprise, and Research and Development. Each segment of this part of the course was allocated 15 class days, although the teacher was encouraged to develop any one of the sections further as it best fit the program of the school.

In all, 51 teacher guides and 59 learning activity packages were developed for the first edition of the handbook. A limited number of the first-edition handbooks was printed for use by institute teachers in their classrooms during the following year.

The Second Production Institute. The second Production Institute was conducted during the summer of 1978 with eight teachers enrolled for a four-week period. The basic purpose of the institute was to revise the handbook, with revisions based upon the experiences of teachers who had used the handbook during the preceding year.

Handbook Revision. Three of the basic goals for revising the handbook were: (1) to provide for more comprehensive treatment of construction systems; (2) to make the course design more flexible and facilitate the selection of specific parts of the course to fit the local school situation; and (3) to improve the interest level and efficiency of a number of the activities.

The revised handbook contained five basic groups or blocks of activities with a total of 37 teacher guides and 72 learning activity packages. The basic groups of activities were: (1) an *overview* of the ten basic systems in the Production Systems Model (condensed to two weeks duration); (2) activities representing different types of *material processing;* (3) several *research and development* activities; (4) and expanded and systematic set of *construction enterprise* activities, and (5) a revised set of *manufacturing enterprise* activities. See Figure 1.

Overview Units

1. Basic Systems of Production
2. Resource Systems
3. Management Systems
4. Material Processing Systems
5. Power Systems
6. Communication Systems
7. Personnel Systems
8. Transportation Systems
9. Marketing Systems
10. Finance Systems
11. Goods/Services/By-Products

Material Processing Units

1. Material Processing Overview
2. How Materials are Formed
3. How Materials are Separated
4. How Materials are Combined
5. How Materials are Conditioned
6. Material Processing Synthesis I
   Material Processing Synthesis II

Research and Development Units

1. A Problem-Solving Model
2. Egg Recovery Vehicle
3. Model Rockets
4. Land Speed Record Assault Vehicle
5. Mouse Trap Vehicle
6. A Bridge Over the Roaring River

Construction Enterprise

1. Planning To Meet Construction Needs
2. Planning the Site
3. Developing the Project
4. Contracting
5. Planning the Production System
6. Constructing On-Site
7. Completing the Project

Manufacturing Enterprise

1. Developing the Product
2. Setting Up the Company
3. Financing the Company
4. Production Planning
5. Producing the Product
6. Evaluating Production
7. Evaluating the Company's Worth

Figure I. Units Within Each Group

This structural revision made it easier for the classroom teacher to select specific units out of the total package. In addition, the new structure made it possible to suggest as many as nine different course designs, any one of which would provide a broad exploratory view of the many facets of production technology.

Pilot Projects. The current materials are being tried in six school systems throughout the state. Information gained from these pilot projects will be used for a final revision of the handbook during the summer of 1979.

REFERENCE

The Iowa Guide for Curriculum Improvement in Industrial Arts, K-12. A Study of Industrial Technology. Des Moines, Iowa: Iowa Department of Public Instruction, 1975.

AIAA W-9:00-19 MODIFICATION OF EXISTING IMP CURRICULAR MATERIALS. James R. Heggen, Associate Professor, Department of Industrial Arts Education, Florida State University, Tallahassee, Florida, and John J. Geil, Vocational Resource Teacher, Brevard County Schools, 1274 South Florida Avenue, Rockledge, Florida.

This project was undertaken because few student materials of an individualized nature have been in use in the field of industrial arts education in Florida. This is primarily due to the lack of emphasis traditionally placed on the development and use of student materials in industrial arts. In addition, the teaching/learning methodology employed has rarely incorporated the use of individualized student materials.

One of the most controversial areas in industrial arts education is Industrial Materials and Processes (IMP). Little agreement exists on the content that should comprise IMP, and only limited guidelines have been available on the methodology and student activities that should be used.

Since 1970, the IMP curriculum has undergone constant modification, and has gradually grown into a multi-system, ranging from traditional shop activities to testing and research activities. Several attempts have been made to consolidate these various approaches into one basic plan that would meet the needs of industry and education statewide. These plans have concentrated on the development of a state guide, a catalog of competency objectives, and several district guides. However, none of these plans has addressed the development of student materials for IMP. Therefore, the Division of Vocational Education, Florida Department of Education, selected Industrial Materials and Processes as one of the curriculum areas on which it would concentrate its efforts to find and acquire noncommercial materials and awarded a project grant to Florida State University.

In order to establish the characteristics of instructional materials being used by IMP teachers and the content areas for which individualized instructional materials were most needed, a survey instrument was developed. The survey instrument was sent to 100 IMP teachers by way of district supervisors or letters to individual IMP teachers. A committee consisting of five representative IMP instructors and one district supervisor was then assembled to study the survey results and establish desired materials characteristics and priorities. The areas of greatest need were found to be:

1. Materials that are structured to facilitate individualization.
2. Materials that include learning activities, such as self-tests, designed to provide students with practice opportunities and feedback on their achievement of objectives.
3. Materials that contain management information for the instructor, such as record-keeping forms, directions, and examples of implementation methods.
4. Materials that are complete and up-to-date.

The committee felt strongly that priority 3 would be the key to the success or failure in teacher implementation of any instructional materials recommended.

The instructional content areas needing individualized instructional materials were ranked as follows:

1. Plastics, including properties and characteristics and techniques of processing the material.
2. Testing of materials for their identification and properties.
3. Information and evaluation of related careers and occupations in all content areas.

A computer search generated 360 potential items to be reviewed. By screening the abstracts, it was determined that 46 out of the 360 items might meet our needs. Microfiche copies of these items were obtained for examination. Preliminary selections were then ordered in hard copy for final review. Committee members agreed that the materials developed by the Oregon Department of Education most closely matched the needs of the IMP teachers and students in Florida. With slight revisions only, the materials were then reproduced in quantity by FSU's Career Education Center. We are grateful to the state of Oregon for granting reproduction permission at no cost to Florida. The modules now available cover general information, properties of materials, woodworking processes, metalworking processes, and welding and foundry processes. Still needed are materials on plastics and sheet metal.

Dissemination was accomplished by conducting several regional workshops for teachers. In addition to receiving the modules, participants were given a teacher guide we developed to aid in managing the system. Travel and per diem for participants was provided by the project.

While it is too early to assess the degree of implementation and ultimate impact of the materials, we believe that this project was an outstanding example of state, university, district, school and teacher cooperation. Excellent materials were provided to teachers at a fraction of the cost that would otherwise be required to develop new modules. Total time from the award of the project to dissemination was less than a year.

AIAA Tues. - 3:00 - 4:30

INDIVIDUALIZED WELDING INSTRUCTION

Hal Riddle: Dept. Head - Industrial Arts
Cubberley Senior High School
Palo Alto, CA 94303
Part time Instructor - San Jose State University
Industrial Studies Dept.
San Jose, CA.

PREFACE:

This was an attempt to provide a unit by unit approach to developing a skill on an individual basis.

The rationale evolved from two basic factors:

1. Continuous flow of some students in and out of the program. Consequently - on any given Monday I was faced with a new student several weeks after basic information had been covered.
2. Many of the students had good manual dexterity, native intelligence, but lacked the reading skills to use a text successfully.

BACKGROUND

What I have described to you is probably typical of most industrial arts courses including mine. For, reality of those we serve has changed my concept considerably. It was either work with them - or - work against them. I don't have to indicate to you the disaster created without compromises.

SOME HISTORY OF THE INDIVIDUALIZED CONCEPT

I think that the statement can be made that the successful Industrial Arts teacher has always used the individualized approach to learning. For - in any given Industrial Arts Laboratory, no two students are using exactly the same skill on a day to day basis.

In Oregon several years ago, a group of Industrial Arts teachers developed a unit by unit approach. Three years ago it was my privilege to work with a group at De Anza Jr. College in San Jose, California on similar development. It was from this exposure and through classroom experimentation that I developed a series of oxy welding packages.

WHAT DO I USE AS INSTRUMENTS TO IMPLEMENT THE PROGRAM?

1. AUDIOVISUAL:
   a. Film loop projector and film loops
   b. Film strip projector and film strips
   c. 16 M Projector and films
   d. Overhead projector
2. A UNIT PACKAGE
   (such as the one provided as an example)
3. A classroom set of welding texts
4. A few dictionaries
5. A classroom environment
6. Welding laboratory

WHAT ACTIVITIES ARE PROVIDED IN EACH PACKAGE?

A. Learning activities include:
   1. Specific terms to research
   2. The audio visual selection
   3. Word spelling list
   4. Hand out sheets
   5. Information section
   6. Self test
   7. Welding laboratory
   8. Post test or written exam covering the unit

AT THIS POINT REFER TO THE PACKAGE

HOW DO YOU SET UP THE CLASSROOM?

1. Organize the audio visual equipment at permanent stations.
2. Organize all films, etc., unit packages, handout sheets in drawers or cabinets by numbers corresponding to the unit.
3. Prepare a master sheet that gives the location of each of the organized unit packages.
4. A scope and sequence or flow chart to be used as a progress report.

HOW DOES THE STUDENT USE THE FACILITIES?

1. Original class:
   From the first day, the procedure is described and the mechanics of implementation are explained.
2. The New Student
   a. As all of us have done for years, I use an advanced student to implement the orientation procedure. The new student is guided through the first three days in order to establish procedure.

WHAT ARE THE ADVANTAGES IF ANY?

1. Each student works at his own pace.
2. Individual differences are provided for.
3. There are no FAILURES - since a student repeats his welding samples until the sample meets the objective requirements.
4. What is really happening is a block building process. You move from A to B when A is completed.

HOW IS EVALUATION COMPLETED?

1. SELF TEST
   a. After the student reads the material he is asked to view the film loop describing the particular lesson.
   b. He is then asked to complete the self test and compare his answers with the provided answer sheet.
2. PRACTICE SAMPLES
   a. The student then produces weld samples on the unit until an acceptable sample is produced.
3. POST TEST:
   a. The student is then given a final written examination on the unit just completed.
   b. The choice of Pre vs. Post test I suppose is confusing. What we are really talking about is a sort of a final written evaluation before proceeding on.

WHAT ARE THE OXY WELDING UNITS DEVELOPED?

1. Safety
2. Equipment
3. Adjusting gas pressures and lighting the torch
4. Types of flames
5. Beads without rod
6. Beads with rod
7. Butt welding
8. Lap welds
9. Outside corner welds
10. Fillet or "T" joints
11. Thin gage welding
12. Pipe and tube welding
13. Brazier welding

Footnote:
1. "Individualized Oxy Welding Package"
   Oregon State Department of Education, Salem, Oregon 97110

INTERNATIONAL PERSPECTIVE

AIAA, TU-10:45-12
REPRODUCTION(MICROFILM). Claude A. Bell, associate professor, Department of Industrial Technology, Illinois State University, Normal, Illinois.

The first title for this presentation was taken from International Micrographic Congress' book written by James H. Mann entitled REDUCING MADE EASY. This did not seem to convey the message that I hope to present so the title was changed to REPRODUCTION MADE EASY. That obviously should not be my presentation albeit it would interest many of you.

Today I will try to trace the development of microfilm. Included will be some anecodotes or fables. The industrial usage with their advantages will be discussed. We will look at microfilm systems and equipment necessary for production and use. Lastly we will try to link this to our classes and our students.

We are all familiar with microfilm, but what is its history? Microfilm developed from a hobby or a novelty method of transmitting messages to a method of copying invaluable documents to today's new technology that allows business, industry, education and government to film, file, retrieve and use valuable documentation.

The earliest recorded use of documents too small to be read by the unaided eye are dated 3000 B. C. Clay cylinders were found at Nineveh with letters requiring a magnifying glass to read. The development of microfilm, however, closely follows the development of photography. The early 1820's gave us our first relatively permanent photographic prints as a Englishman and a Frenchman produced almost the same product at approximately the same time, but with different processes.

During the 1840s and 1850s several photographers and optical equipment makers experimented with photography and microscopes. Dancer and Dagron appeared to make the most commercial use of microphotography. Dancer in producing pictures for his lantern slides to be used in his lectures and Dagron in producing novelty jewelry with photographs in them.

The Franco-Prussian War gave some imputes to the use of microfilm when Dagron was requested to set up a method of communication between Paris and the rest of France. Dagron used racing pigeons with microfilm messages, up to 80,000 words, tied to their tail feathers.

George L. McCarthy, a banker, provided the greatest commercial use of microfilm in the 1920s when after seeing a motion picture he developed the flow camera to microfilm bank checks. This successful venture stimulated many other applications. Librarians were interested in the promise of reducing shelf space and making scattered information available to many libraries.

The development of microfilm readers about 1928 provided the additional tool which made the use of microfilm practical.

World War II brought back Dagron's "Pigeon Post" as the United States produced the greatest microfilming operation in history with V-mail. Many government departments began to expand their use o microfilm. The Filmsort aperture card was developed in the Office of Strategic Services. Engineering companies recognized the value of this unit microfilm carrier. With the outbreak of the Korean War, military use of microfilm was greatly expanded.

Today microfilming is accepted as one of the better methods of filming, filing, retrieving and using information. A recent study indicated that 42 percent of the responding companies and organizations were using microforms and another 20 percent were making plans for microform utilization.

Records of the microfilm industry tell us that the most common size microfilm used is 16mm. The engineering industry is geared toward 35mm, but we find extensive use of 70 and 105mm microfilm for specific requirements.

Microfilm is used in several different forms. These include roll film, microfiche, aperture cards and film jackets of a variety of sizes. The type of information or data being used and the way it is to be used will determine microfilm format and size as well as the equipment needs for required results.

Equipment will vary greatly according to the specifications of the job requirements. To produce microfilm requires a recording device and a processing unit. To use microfilm you must have a reader. In a microfilm system you may have in addition duplicators, reader/printers, and storage and retrieval equipment.

In a classroom for the drafter, the two greatest problems that are presented by microfilming is lines and lettering. Lines must be clean, sharp and dark. Lettering, although it is still not standardized for microfilming, is presenting problems in blowbacks. Lettering must be provided that is of the correct size for reduction and blowback requirements of the equipment to be used.

Microfilm of all forms and sizes are here to stay. The economics of reproduction, storage, retrieval and distribution of large amounts of a variety of information and data has insured the future of microphotography. Every day we find more and greater usage of microfilm in parts catalogs, government publications, engineering drawings and specifications, research reports, etc.

Color has been added to micropublishing as it has to all forms of publications. As the public becomes more aware of the advantages of microfilm; as readers become cheaper; and as distribution cost climb, we will see another great expansion of the microfilm industry. We must prepare our students for this eventful happening.

Gaddy, Dale, A MICROFORM HANDBOOK, National Microfilm Association, Silver Springs, Maryland.

Mann, James H., REDUCING MADE EASY, THE ELEMENTS OF MICROFILM, Moore Publishing Company, Durham, North Carolina.

Nelson, Carl E., MICROFILM TECHNOLOGY, McGraw-Hill Book Company, New York, New York.

AIAA. WED-3-4:30

THE PEOPLE'S REPUBLIC OF CHINA: SLIDES & REFLECTIONS ON TECHNOLOGY, EDUCATION, AND CULTURE. Arvon D. Byle, Professor, Department of Industrial Education, Western Michigan University, Kalamazoo, Michigan.

This 18 day tour of the People's Republic of China (PRC) included visits to the following cities: Peking, Nanking, Yangchow, Shanghai, Hangchow, and Kwangchow (Canton).

In reviewing the state of technology across the PRC, one must temper the observations by noting the biased selectivity of the Industrial visits as chosen by our Chinese hosts. To be sure, we were not shown the most modern technical facilities due in part to the political fetish for secrecy. One could, however, note a frequent air of embarrassment on the part of guides and officials with regard to the antiquated equipment being used for production, transportation, and agriculture. The ubiquitous presence of such out-moded technology seems to point to the validity of the observation that China is 20-30 technical years behind the U.S. and Japan.

This slide program exhibits a representative selection of examples illustrating technology in: (1) industry and manufacturing; (2) transportation; (3) communications; (4) building construction; (5) agriculture. The PRC does utilize heavy industrial plants to produce petro-chemicals, steel, paper and numerous other products. The level of productivity remains low due to the lack of modern equipment and sophisticated production planning.

From a technical perspective, transportation is most backward and in need of rapid modernization. The entire culture seemingly moves by bicycle. Rail, water, and truck usage offer minimal services and air transport is virtually non-existent. There are, of course, no privately owned automobiles in the PRC. Mass-transit bus systems are most efficient and well used.

The basic communications industry via printing-publishing, newspapers, radio & TV, and wire systems appear to be quite contemporary in design and methodology. The major failure at this point seems to be a lack of equipment and limited resources for advanced research.

Organized agriculture, being the backbone of the country, is woefully weak in its use of technology. Man and beast still predominate the scene with little or no help from mechanized equipment and chemicals. One stands in utter amazement at the realm of repeated human tasks performed in the fields. The Chinese are also masters at organic farming and thus recycle all available organic materials. Since little fertile land is currently left unused, greater production can only come by better implementing technology into farm production.

Building construction abounds everywhere. Multi-storied living quarters provide the source for most of the activity. Construction technology is decades away from being efficient and mechanized in even the remotest fashion.

The major focus of China's educational system will be to stress the importance of science and technology, particularly in courses which have applications in industry and agriculture. In striving toward programs of technical modernization, current leadership has recognized the curricular shortcomings of stressing political ideologies and thus a major turnabout in the schools is already evident.

After such a minimal exposure to the Chinese culture, which is so far removed from the technology-swept U.S., one hesitates to offer many definitive conclusions. There are some, however, which are clearly supported:

1. China is a great industrial polluter of its environment and yet paradoxically wastes little by recycling materials back into nature.

2. There is vast inefficiency in the labor force which currently provides jobs for everyone. Spreading technology will cause a major conflict between man and machine.

3. It will take many decades for the average family to realize benefits of technical upgrading because of the dirth of current technology.

4. China is no threat politically to developed nations - their technical expertise is too far behind.

5. The lack of material incentives within the labor force promotes a gentle society but creates a vast wasteland of human talent. Human initiative is very low.

AIAA W-12:00-2 The Role of International Relations in Industrial Arts Education. David L. DePue, Program for the Study of Technology, West Virginia University, Morgantown, WV.

Ours is certainly a shrinking world. A traveler can reach any point on the globe in less than a day. The telephone and radio and now TV and satellites send voice and pictures around the world in seconds. News coverage is prompt and global. Major events world wide are reported along with community happenings of the same day.

It is no longer possible for nations to be isolationists. A global view is necessary as we trade for energy, minerals, products, and services. The concept of spaceship earth is very descriptive of our situation. All nationalities must co-exist on this sphere as we travel through space and time. The resources are finite and the environment is fragile. Therefore, global cooperation may be the key to a long-term existance of the human race.

Technology has clearly been the dominent element in the history of mankind: fire, tools, the wheel, and systematic thinking have brought humans from the level of beasts to still emerging heights. Technological advances now promise to surpass even our fiction and fantasies.

But what of this technology which appears to be our master. How do we attain control?

Make notice of the increased use of the terms technology transfer, technology assessment, and now appropriate technology.

Appropriate technology (AT) can be defined as technology which has been chosen for the value given it as a result of applying certain criteria. After due consideration, a judgement is made on which of the available technologies will be implemented. These value judgements connote knowledge of the issues and must be made by the persons involved and affected. This process requires people who are literate; that is, knowledgeable of technology and its many implications.

Industrial arts education exists to promote an understanding of industry and technology. The International Relations Committee of the American Industrial Arts Association (AIAA) contributes to the mission by: 1. Advising the association through the executive board on policy and mission as it relates to the world community. 2. Encouraging professional involvement of industrial arts teachers andsupervisors who represent other nations. 3. Providing resource information for teachers contemplating international exchange opportunities. 4. Promoting international exchange opportunities for industrial arts teachers. 5. Providing liaison for the consortium of International Associations. 6. Conducting an international reception at the annual conference. We are working to strengthen industrial arts education, and through understanding, make a better world for all inhabitants.

AIAA. W-3:00-12

INDUSTRIAL ARTS IN AUSTRALIA. Kevin R. Morgan, lecturer in industrial arts, Newcastle College of Advanced Education, New South Wales, Australia.

Australia has a bicameral federal system of government, and its responsibilities include public education in the Australian Territories. The six states in Australia are each responsible for providing the educational services for their citizens, which they do through systems that are centrally administered. The result is a conformity of teacher quality irrespective of the geographic, demographic and economic situation of the school community. Industrial arts teachers receive their tertiary education at either Colleges of Advanced Education or Universities, and are usually well versed in the areas of technical drawing, wood technology, metal technology, basic engineering, and craft together with a sound base in the theory and practice of teaching.

Industrial arts is not taught as such throughout the infants and primary schools which go from years K-2 and 3-6 respectively, but a closely allied area "Craft" does play a significant role. In concept, this is akin to the elementary industrial arts concept in the United States, of an enrichment and integrating activity.

All territories and states offer industrial arts programs in their secondary schools and while they may vary slightly from each other in nomenclature, content and objectives, they are not generally oriented to achieve vocational ends. Industrial arts is seen as an important complementary part of tne adolescent's general education, and is usually a part of the core for some portion of the student's secondary schooling. Due to the unavailability of space this report shall deal only with two States and a Federal Territory.

South Australia

South Australia utilizes the term "technical studies" to describe a diverse range of courses offered, including woodworking, metalworking, plastics, photography and power, which are taught to students in a variety of forms from years 8 to 12, in a coeducational, comprehensive setting.

The Northern Territory

Manual arts is the term used for industrial arts and it is taught between the years 8 and 12, with an accent on metalwork, woodwork, technical drawing, plastics and leatherwork. Distances between schools present a real problem here.

New South Wales

Industrial arts is taught in years 7 to 10 of secondary school via technics, industrial arts and technical drawing. The subject "industrial arts" referred to here is taught in years 9 and 10, and is involved largely in the process aspects of student development, through the "design brief" method.

Technics gives the opportunity to the student to choose from a wide variety of "strands," which utilize a time limitation referred to as a "lobe" often resulting in "semester" type courses. There are 26 different strands available to be taught in technics, such as plastics, sheetmetal work and woodcrafts. The total number of lobes for all strands is 57, reflecting the degree of diversity present in technics.

SELECTED COMPARISONS OF INDUSTRIAL ARTS IN AUSTRALIA

	NEW SOUTH WALES	SOUTH AUSTRALIA	NORTHERN TERRITORY
TITLE	Industrial Arts	Technical Studies	Manual Arts
YEARS TAUGHT	7-12	8-12	8-12
SYLLABUS	Centrally administered with school input	School based	School based
TRAIN OWN TEACHERS	Yes	Yes	No
MAJOR TEACHER TRAINING INSTITUTION	Newcastle College of Advanced Education	Torrens College of Advanced Education	Draw largely from Torrens CAE since South Australia controlled IA here until 1971
ACCENT	General education	General education	General and vocational education
MAJOR AREAS TAUGHT	Jr. high: technics, industrial arts, tech. drawing. Sr. high: (11-12) technology, 2-unit eng. science, 3-unit eng. science	Metalworking, woodworking, plastics, photography and power technology	Woodworking, metalworking, tech. drawing, plastics, leatherwork, photography and mechanics
PROFESSIONAL ASSOCIATION	Institute of Industrial Arts	Technical Teachers Association	Manual Arts Teachers Association
PROBLEMS	·Surplus of IA teachers ·Wide diversity of junior IA and marked difference to the more theoretical senior IA	·Surplus of IA teachers ·Senior IA not accepted by Universities	·Small population in large territory ·Senior IA not accepted by Universities

In the senior section of the high school, i.e., years 11 and 12, the industrial arts syllabus comprises two course offerings. One course is termed technology, and has a practical bias. The other is termed engineering science, and consists of graphics; "analysis," comprising basic engineering mechanics and materials science; and "applications" which attempts to integrate the other two sections by way of industrial applications in the light of historical developments.

MANUFACTURING

AIAA. T-3-4:30

A CONCEPTUALIZED PRODUCT SERVICING MODEL.

W. D. Umstattd, associate professor, Industrial Technology Education, The Ohio State University, Columbus, Ohio.

The concept of servicing the manufactured products that have contributed to improving the standard of living for Americans soon may have a greater impact on our industrial economy than ever before. This emphasis may not drastically change the various curricular objectives for studying industry and technology, but could cause a reevaluation of the priority system for the goals of industrial arts education. Therefore, the importance of becoming more knowledgeable about career choices and consumer education may have a much greater level of significance on what is anticipated to become a "goods servicing" economy.

A cursory analysis of the inputs to industry may provide a rationale for changing the thrust when studying manufacturing technology. First, there is the ever-dwindling supply of natural resources particularly those which are extracted from the earth. Second, there is the problem of adequate supplies of energy to convert these natural resources to industrial goods and still supply energy for other domestic needs. A third concern is money to finance and operate industries. Money becomes more expensive to obtain as the interest rate and cost of maintaining production increase. A fourth input, knowledge of managed production systems, is going to result from creative thinking in devising alternatives for these formerly stable traditional inputs. Fifth, the human resource is in competition with, and being displaced by, machines and equipment in many manufacturing systems.

Much of the demand for the input-process-output manufacturing system is cost effectiveness. The capacity to produce quality goods at competitive costs is a high priority. As a result, more and more automated, and electronically controlled systems are being implemented to produce manufactured goods.

To offset the problems of employee displacement caused by automation many servicing careers may utilize the skill and knowledge identified in the industrial arts objectives. Americans should be encouraged to learn about product servicing for several reasons. In addition to career choices, there is the need to conserve material and energy used in the manufacture of products. This means extending the "product life" for the goods people use. All too many reconditionable products are relegated to refuse landfills the first time they fail to function adequately. With some knowledge of the concepts of servicing and necessary repair parts, the consumer can extend the life of the product.

Some effort has been made toward structuring the concepts of product servicing. Bateson and Stern (1963, p. 15) stated that product servicing is (1) diagnosis, (2) correction, and (3) testing with correction consisting adjustment, replacement, and/or repair. The IACP (Towers, Lux, and Ray, 1966, p. 190) applied the term "post-processing" to (1) installing, (2) maintaining, (3) repairing, and (4) altering as concepts of product servicing.

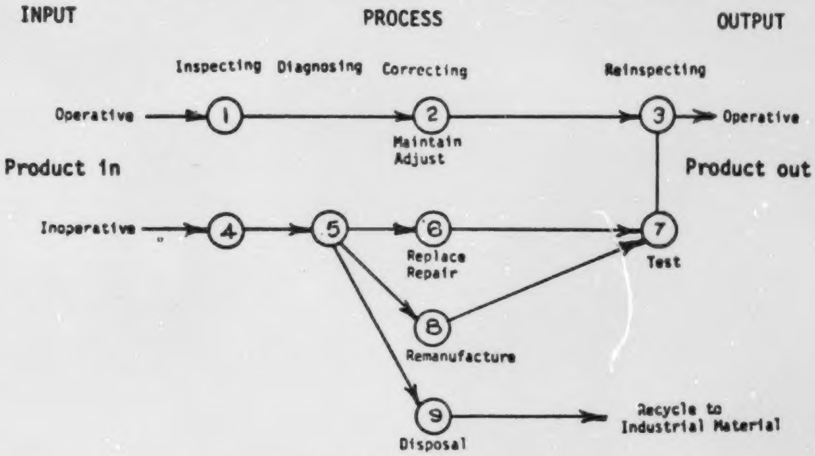
The following conceptual structure identifies product servicing:

Product Servicing

1. Installing
2. Inspecting
3. Correcting
    - 3.1 Maintaining
    - 3.2 Adjusting
    - 3.3 Replacing

    3.4 Repairing
    3.5 Remanufacturing
    3.6 Disposing
4. Reinspecting

Conceptual modeling may be applied to this structure of servicing. The model relates finished products to the input-process-output system.



INPUT
PROCESS
OUTPUT
Inspecting
Diagnosing
Correcting
Reinspecting
Operative
1
2
3
Operative
Maintain
Adjust
Product in
Product out
Inoperative
4
5
6
7
Replace
Repair
Test
8
Remanufacture
9
Disposal
Recycle to
Industrial Material

Product Servicing Model

REF. NO.	PRACTICE
1.	Operative product is visually inspected.
2.	Operative product is corrected as required.
3.	Operative product is in service after reinspection.
4.	Inoperative product is visually inspected.
5.	Inoperative product is diagnosed during disassembly.
6.	Decision made to repair or replace faulty component(s).
7.	Testing is done during reassembly.
8.	The alternative to repair is to remanufacture.
9.	Disposal occurs if servicing is not economical.

A significant portion of the industrial economy in the United States seems to be evolving to a goods servicing economy. Servicing may become a higher priority in the industrial arts curriculum. Understanding and applying the generalizations of this product servicing model may become a viable factor for measuring a successful educational program.

Bateson, W. M., and Stern, J. The functions of industry as the basis for industrial education programs, *Journal of Industrial Teacher Education*, Volume 1, No. 1, Fall 1963, pp. 3-16.

Towers, E. R., Lux, D. G., and Ray, W. E. *A rationale and structure for industrial arts subject matter*, A joint project of The Ohio State University and the University of Illinois, sponsored by U.S. Office of Education, Bureau of Research, Division of Adult and Vocational Research, Columbus, Ohio, November 1966.

METRICS

AIAA. TH-1:00-6
METRICS FOR BEGINNERS. Ronald E. Jones, Center for Occupational Education, University of Massachusetts, Amherst, MA 01003.

Metrication in the United States has lost that "bandwagon" appeal that was popular in the last five years. The movement has settled down into a slow, but steady, forward drive. The United States will eventually become a totally metric country despite the efforts of some anti-change groups. Industry will guarantee the change.

Major manufacturers in this country have committed themselves to the changeover to metrics in all aspects of industry. This is a necessity on their part to survive in a world where international trade is the key to continued sales and a broader market. When the major manufacturers changeover to the metric system, the smaller companies will be forced to change to stay in business. The large manufacturers have made the committment to change and are implementing change daily. They are simply not advertising this fact to the general public any more.

Education in general and Industrial Arts in particular must be aware of this movement to metrics. Since the Industrial Arts teacher is concerned with various units of measurement in laboratory courses, it is the ideal place to initiate the change in measurement systems.

Unfortunately, there is a misconception that Industrial Arts teachers are completely knowledgeable about all aspects of the metric system of measurement. These teachers are not magically "zapped" with this knowledge the instant they receive the Bachelor's degree. Therefore, the Industrial Arts teacher must learn this system of measurement and how it should be implemented and used in the classroom.

This information is available from a large number of sources that are accessable to the teacher. Many of the sources provide free literature while others will charge a nominal fee. The following list of information sources will provide the reader a starting place to obtain information.

The AIAA Metric Speaker's Bureau. During the 1979 San Antonio Conference, a major project was completed by the sub-committee on Metric Speaker's Bureau. Members of the project included Michael Atkins, Western Michigan University, Arvon Byle, Western Michigan University, and Ronald E. Jones, University of Massachusetts.

The Metric Speaker's Bureau is a listing of individuals that have indicated their willingness to serve as metric speakers/consultants. Individuals listed may offer workshops, seminars, formal classes, speaking engagements, curriculum planning, or developing metric resource centers.

The Metric Speaker's Bureau Booklet contains a listing of 57 potential speaker's/consultants. They are categorized alphabetically and by area of expertise. The speaker should be contacted directly. Copies of the Speaker's Bureau Booklet have been mailed to Department Heads/Chairpersons/Directors currently listed in the ACIATE Industrial Teacher Education Directory. In addition, all State Supervisors of Industrial Arts will receive a copy. Finally, the remaining copies will available for individual requests, however, supplies are limited and no reprint is planned at this time.

A second major source of information is the U.S. Metric Board, 1815 N. Lynn Street, Arlington, Virginia 22209, (703) 235-1933. This board has been established and is meeting regularly. The contact person for Education is Dennis Smith. The Metric Board will be providing materials to promote the changeover to metrics and should establish a national policy to plan and coordinate the changeover.

AIAA. Tu--1:00-2:30

WHY METRICATE--PLASTICS AGE. Terry Richardson, Chairman, Department of Industrial and Safety Education, Northern State College, Aberdeen, SD.

The metric system of measurement is rapidly becoming a reality for everyone. Those who teach about plastics or those designing plastics parts and components must know how to express physical property values for plastics materials.

To prevent any misunderstanding and to stop the proliferation and misuse of obsolete metric systems, use only the "System International d'Unites" (SI) metric system of measurement. The SI metric system supersedes the familiar or cgs metric system.

Selected SI metric units will be viewed as they apply to plastics properties and testing of polyvinyl chloride.

The relative density of a plastics is the density of a given substance divided by the density of water. Relative density is a constant number under controlled condition of air pressure and temperature. It is a dimensionless quantity.

Example: $$\text{relative density} = \frac{\text{density of polyvinyl choride}}{\text{density of water}} = \frac{1\,300 \text{ kg/m}^3}{1\,000 \text{ kg/m}^3} = 1.30$$

Density is the mass per unit volume of a plastics. It is obtained by dividing the mass of plastics by its volume.

Example: $$\text{density} = \frac{\text{mass (kg)}}{\text{volume (m}^3\text{)}} = \frac{1\,300 \text{ kg (mass of PVC)}}{1 \text{ m}^3 \text{(volume of PVC)}} = 1\,300 \text{ kg/m}^3 \text{ or } 1.3 \text{ g/cm}^3$$

In order to comprehend the unit of measurement that describes the property of stress we must understand the metric unit of force. The newton is the SI derived unit of force. A kilogram is a unit of mass. The standard value caused by gravity on earth is 9.806 65 m/s^2. The force on one kilogram is thus 9.806 65 newtons.

Example: $$\text{Force (N)} = \text{mass (kg)} \times \text{acceleration (m/s}^2\text{)} = 1 \text{ kg} \times 9.806\,65 \text{ m/s}^2 = 9.806\,65 \text{ N}$$

If you were to hold 100 g of PVC in your hand, what force is required to keep if from falling?

Example: $$\text{force} = 100 \text{ g} \times 9.8 \text{ m/s}^2 = 0.100 \text{ kg} \times 9.8 \text{ m/s}^2 = 0.98 \text{ N}$$

The metric unit used to express force applied over an area is the pascal. One pascal is equal to a force of one newton exerted on an area of one square metre.

Example: Pressure (Pa) = force (N)/area (m^2) $\quad$ 1 Pa = 1 N/m^2

All kinds of stress (pressure) including tensile strength, modulus of elasticity, shear strength, compression strength, flexural strength and adhesion are measured in pascals. Stress is calculated by dividing force by area.

Example: Stress (pressure) = force/area $\quad$ Pa = N/m^2

It is easy to calculate the force and pressure exerted on a surface by 2 kg piece of PVC measuring 50 mm x 100 mm at its base.

Example: Area = 50 mm x 100 mm $\quad$ 5 000 mm^2 or 0.005 m^2

Force = 2 kg x 98 m/s^2 = 19.6 N

Pressure = 19.6 N/0.005 m^2 = 3920 Pa or 3.920 kPa

Tensile strength may be calculated by dividing the maximum load (force) by the original cross-sectional area.

Example: Tensile strength (Pa) = pulling force (N)/cross-sectional area (m^2)

The Izod and Charpy impact resistance is a measure of the energy required to break a specimen. All forms of energy (work) will be measured in joules.

Example: Energy (J) = force (N) x distance (m) 1 J = 1 N·m

In order for a man or machine to lift a 50 kg bag of PVC to a height of 1 m, it will require 490 J of energy.

Example: Force = 490 N Energy (work) = 490 N·m or 490 J

Impact resistance must consider the thickness of the materials for energy comparisons. The values are expressed in joules per metre (J/m).

Hardness is an arbitrary unit; consequently, the numerical value will not change. Rockwell 110-M and Shore 75-A are typical hardness values.

The coefficient of expansion is used to determine thermal expansion in length, area, or volume per unit of temperature rise.

If a PVC rod 2 m in length is heated from -20°C to 50°C, it will change 7 mm in length. Example: Coefficient of linear expansion x original length x change in temperature = 0.000 050/°C x 2 m x 70°C = 0.007 m or 7 mm

Kelvin is the preferred thermodynamic scale; however, the Celsius scale is permitted and in general use. Heat resistance for PVC is from 65-80°C.

Dielectric strength is a measure of electrical voltage required to break down or arc through a plastics material. The units are reported as volts per millimetre of thickness. PVC has a dielectric strength of 15 000-19 500 V/mm.

Linear mold shrinkage is a ratio of decrease in length to the original length of a molded test specimen; consequently, the numerical values do not change. The units are usually expressed in millimetres per millimetre for clarity.

Start teaching and thinking hard conversion. Think and use whole or convenient numbers when discussing measurement standards. For example: 25 lb. bags of PVC would not be converted to 22.68 kg bags but to 25 kg bags.

Engineering standards will eventually reflect this approach. To be most effective, educators, fabricators, manufacturers, processors, and lay public must "think metric".

MISCELLANEOUS STUDENT/PROJECT/ PROGRAM RELATED

AIAA. TU-1:27-3

A MOTIVATION METHOD IN INDUSTRIAL ARTS FOR THE IMPROVEMENT OF READING.

Jarvis Baillargeon, Supervisor of Industrial Arts Education, New York State Education Department; Herbert Siegel, Director of Industrial Arts, New York City Board of Education and John Surra, Supervisor of Industrial Arts Education, New York State Education Department.

The problem facing most concerned educators today is - "Can Johnny and Jennie learn to read?"

The Industrial Arts staff, believing that children can learn to read once they see the need to read, developed an experiential module called the Elementary School Publishing Activity Center.

This program helps to motivate learning and establish in the minds of the children reasons for reading, writing, and performing all the related functions required to publish their own creative writing and art work. It provides children with an opportunity to apply academic learnings and make them meaningful. The interdisciplinary involvements with science, language arts, social studies, mathematics, art, and other subject areas are unlimited.

A formal research study (1974-78), conducted by the New York State Education Department, entitled "The Effects of Industrial Arts Publishing Activity Center on Reading Achievement Scores," clearly indicated in the results of the analysis that: "each Publishing Activities Center studied had a strong statistically significant association with an increased rate of reading achievement gain during its second and fourth year of operation for all students."

Six elementary schools with new units installed in the fall of 1974 were asked to maintain a student-by-student record of time spent in the PAC. At the end of the year individual student records on standardized reading tests were compared with time spent in the centers. Variables introduced were the grade levels, the mobility of the students,gender, ethnicity, bilingualism, and reading program changes in the schools during the year. A total of 1558 students have been included in the four year testing period. First year effects were neutral but the second year of operation showed startling gains. After a one year hiatus data was collected for the third time and this substantiated the gain shown in the second year. The conclusion is that student individual test scores increased proportionately to the contact hours spent in the Publishing Activity Centers.

This Industrial Arts module consists, basically, of an electric typewriter, electronic stencil maker, electric duplicator, sign maker, plastic binding machine, jogger, stapler, folding machine, and possibly a collator, laminator, and paper cutter. These pieces of equipment are located in schools and in such areas as part of a classroom, an office, or storeroom, or in any area with access to several electric outlets. The above equipment is recommended. However, substitutions may be made that will perform the function in a safe and accepted manner.

The classroom teacher motivates the class prior to the "hands-on" activities. A variety of topics may be included in the discussion emphasizing an interdisciplinary approach to motivate reading. Consumer education, career awareness, current events, short stories, poems, space exploration, mathematical puzzles, and other topics are areas for pupil involvement.

The class engages in research and gathering of material for its publication using newspapers, magazines, and other resources. Pictures, unique lettering, symbols, captions, and paragraph heads may be cut out, saved, and used for copy pasteup. The teacher reviews the written work, correcting spelling, grammar, punctuation, and other pertinent matters. Students then go to the PAC to type, duplicate and bind class publications.

Elementary school principals have indicated that pupils in the program have generally increased their cognitive skills and their participation in interdisciplinary curriculum activities with language arts, creative and functional writing, spelling, vocabulary, and reading; as well as social studies, science, art, health and nutrition, music, and mathematics. This program has also provided a viable and cohesive approach for the school faculty to work together.

PAC's have now increased in number to over 194 units with a projection of additional centers as funding is achieved either through local or reimbursable programs. The New York Times sponsors a city-wide awards program that further enhances our program in the eyes of parents and administrators.

Requests for information have been received from many other interested school systems and State Education Departments. ERIC will send microfiche print-outs of the total program. The State Education Department, Bureau of Industrial Arts, Albany, NY 12230 will send additional information upon request.

It seems that children, like adults, can learn anything they want when they see the need or are strongly motivated. The Publishing Activity Center Module has been most effective in doing just that.

ACIASAO TH-1:00-18

OPERATION OF A STUDENT EXHIBIT AT A STATE CONVENTION.

Clagett Boehner, School Exhibits Manager, Ohio Industrial Arts Association

As School Exhibits Manager my job is to plan and make arrangements for displaying, judging, and the recognition of student made projects at the annual conference.

Some problems involved in displaying of student projects would include,providing sufficient space for the display, having a sufficient number of doors, and adequately large doors to make access to the display area convenient. These things are necessary to avoid a large traffic jam, during the loading and unloading process. The amount of space that has proved to be appropriate for us in Ohio is between 15,000 and 23,000 square feet. This has allowed for a wide aisle between displays, easy access for set-up and tear-down of the displays, and ample display space.

We have used both hotels and convention centers and find fewer problems at the convention centers. Because the display is held in conjunction with our annual conference the cost to the association has been only the electricity to the displays and rental of tables.

The displays are divided into two categories. Open division is for schools with a limited number of entries or an instructor with just a few projects to display. In open division projects are displayed by hanging on wall space (drawings or graphics), on tabl space (small metals), or in floor space (larger woods) that is set aside for this division.

The Booth division is designed to provide an opportunity for schools to show thier total program. A self erected display contained with in an area of 7 feet high, 6 feet deep, and 8 feet wide would constitute a booth display. Booth displays must have a minimum of five areas exhibited. In order that schools of equal size compete against each other in this division it is divided into six different classes by the school size and type.

All entries in either open or booth divisions are classified and displayed by areas. The areas are: Drawing, Electricity, Graphic Arts, Industrial Crafts, Kit Construction, Metals (hot), Metals (cold), Power Mechanics, Photography, Plastics, and Woods. There are also three special areas of display that may be entered. These special areas have special space and content requirements that differ from the other areas of display. The areas are: Mass Production, Research and Development, and Construction.

Judging is done by use of volunteer members who are attending the convention. One member of the School Exhibits Committee has the responsibility for contacting the judges before the conference. The judges are assembled, and given the ribbons for their areas and instructed as to what to look for. Every effort is made by the judging teams to award thier total number of ribbons up to fifty percent of the projects displayed in each area. The projects are judged using the following criteria: Excellence of design and skill, including layout, construction, and finish. Achievement as related to the degree of challenge, grade level, and students age.

Booths and special areas are judged using different criteria. Those used are: Variety of areas exhibited, Overall quality of craftsmanship, Excellence of project design, and Artistic arrangement of the display. The judges for the booth areas are those who are in charge of setting up booths from all other classes except their own class. There is a separate group of judges for the special areas since these areas have certain content requirements.

Plaque awards are given for the First Place and Honorable Mention in each of the six booth classes. The special areas are awarded a First Place and Honorable Mention plaque for both Junior High and Senior High divisions in each of the three areas; Construction, Mass Production, and Research and Development. A Certificate of Participation is given to each school that takes part in the exhibit and each student who displays a project also receives a certificate.

The printing of the certificates as well as the many project cards used during the display is also part of the job of the School Exhibits Manager. The many and varied concerns that deal with putting on a display of student works,as the Ohio Industrial Arts Association does each year, are not limited to any single time of the year. There are tasks that must be performed during all seasons. Many of the tasks must be done far in advance of the display. Some processes must be started even during the time of the current display for the next year.

The single most important point that I feel is necessary to put on a good display is to be super organized.

AIAA. T-3:00-10
STANDARDS FOR INDUSTRIAL ARTS EDUCATION PROGRAMS PROJECT. William E. Dugger, Jr., Director, Dr. Charles A. Pinder, Co-director and E. Allen Bame, Co-director, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061.

On October 1, 1978 the Industrial Arts Program Area at Virginia Polytechnic Institute and State Unversity was awarded a contract (RFP #78-129) by the United States Office of Education, (USOE) to develop Standards for Industrial Arts Education Programs. The major objectives of the project are:

(1) To develop a data base on industrial arts education programs (as defined in Title I, Part C, Section 195(15) of the Education Amendments of 1976) and on industrial arts student instructional program.

(2) To develop a set of standards and related handbooks for insuring quality industrial arts educational programs.

(3) To familiarize, publicize, and demonstrate the standards developed for industrial arts education programs.

The primary purpose of the study is to develop quality standards and guidelines for the improvement of industrial arts programs that support vocational education. Also included in this study will be an effort to establish industrial arts student organization activities as an effective and integral component of the instructional program.

This project will seek to increase the awareness of administrators, supervisors, and teacher educators about the potential of industrial arts as a vital support linkage to vocational education. Another major thrust of the project will be to increase the overall effectiveness of the industrial arts classroom teacher, by providing national dissemination of both information and materials developed by the project.

Another goal of this project is to establish a data base from which qualitative standards can be developed for improving the quality of industrial arts education programs and assuring that the industrial arts youth organization is an integral part of the educational process. The products to be developed will include: guides (handbook) for use by teacher educators, teachers and students to implement and operate an industrial arts student organization; a manual to be utilized by teacher educators, administrators, and teachers in implementing standards; and other appropriate products. The standards, guides, and manual will include recommended procedures to assist in reducing sex-bias stereotyping. Also included will be recommended procedures and activities to support the encouragement of handicapped and minority students to participate in industrial arts education programs.

The proposed duration of the project will be three years, based on a one-year contract for Phase I with optional one-year contracts for Phase II, and III, dependent upon the quality of contract delivery and availability of funds.

An eighteen member advisory committee made up of experts in industrial arts education, vocational education and related areas has been formed to advise the project on the quantitative and qualitative elements of the study. This committee will have input into the design of the survey instrument using their expertise relative to special considerations such as sex role stereotyping, and the handicapped and disadvantaged.

The Standards for Industrial Arts Education Programs Project staff at Virginia Polytechnic Institute and State University is as follows:

William E. Dugger, Jr. - (Project Director)
Charles A. Pinder - (Co-Director)
E. Allen Bame - (Co-Director)
David W. Marsh - (Research Associate)
LaVerne H. Young - (Research Associate)
Dan Miller - (Research Associate)

The project plans a semi-annual newsletter which will communicate the purposes and progress of the project. Anyone who would like to be placed on the mailing list for the project newsletter, please write:

Standards for Industrial Arts
Education Programs Project
Industrial Arts Education
313 Lane Hall
Virginia Polytechnic Institute
and State University
Blacksburg, Virginia 24061

AIAA W-1:00-12
CONTEMPORARY PRACTICES FOR GLUES & ADHESIVES. L. Duane Griffiths, Assistant Professor, Department of Industrial Arts Education, Pittsburg State University, Pittsburg, Kansas

Industrial educators have used glues and adhesives for many years. Most teachers are very knowledgeable about the selection and traditional applications of these bonding agents. Their classroom instruction can be greatly enhanced if contemporary practices for glues and adhesives are also included.

Mechanical adhesion was once considered the only force bonding wooden objects together. The hardened tentacles form a strong link creating the glue line. Specific adhesion was later identified as the second and most important force. A great deal of strength can be achieved through this force due to the molecular attraction between the bonding agent and the substrate.

Glues, adhesives, and cements constitute the three major categories of bonding agents. Liquid hyde glue is one of the oldest and is still selected for the dark glue line it develops. Many glues and most adhesives are transparent upon solidification. This setting-up is caused through a loss of moisture. To achieve the maximum strength of the bond, it is of the utmost importance that the wood be dried to a specified moisture content.

Hot melts are a new field of adhesives that are being used to a great extent in the industrial world. Due to the high solid content this adhesive cures very rapidly. Many applications allow pressure to be applied only with the hands until the material cools and bonds. These adhesives do have the disadvantages of creating a wide glue line and are not considered to develop high strength characteristics.

Alpha cyanoacrylate is the generic name for "Super Glue". This new adhesive is often selected due to its rapid bond and extreme high strengths. Bonding surfaces must be chemically clean and brought together very rapidly to prevent skinning. Alpha cyanoacrylate is not the ideal adhesive for porous materials such as wood and paper.

Cements are used in the form of either contact cements or mastics when gluing woods. Contacts are primarily of a nonflammable variety when utilized in schools. Mastics are a heavy bodied cement with a very high visocity rating. Many mastics are being used in construction applications.

Open and closed time must be considered when using a bonding agent. The length of time a glue line remains open before the boards are brought together is referred to as open time. With most materials this must be kept to a minimum.

Hard to glue woods can benefit by being exposed to a longer closed time. Once the boards are brought together dense woods should "soak" a specified period of time before clamping pressure is applied. This will prevent a starved joint when clamps are applied.

Deposits of glue on the surface create serious finishing problems. Upon staining, light areas are created by the glue preventing penetration of the pigment. Sanding these areas prior to staining is ordinarily the recommended remedy. Many times, however, glue does go unnoticed by the student.

Adhesives are now available that contain fluorescent dyes. These colorants are not detectable under natural light. Exposure to black light does illuminate the glue spots found on the surface of the project. Upon inspection, these areas may be circled with a piece of chalk. Projects can then be sanded thoroughly allowing a superior finish to be applied.

Application of contemporary trends should be one of the major objectives of industrial educators. Teachers can utilize simple inexpensive equipment to expose their students to industrial trends. Obsolete gluing practices have no place in a progressive industrial arts program.

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AIAA. TH - 3:00 - 8

MAKING COLOR PRINTS FROM COLOR SLIDES. Ronald E. Jones, Center for Occupational Education, University of Massachusetts, Amherst, MA and Janet L. Robb, Department of Industrial Technology, University of Northern Iowa, Cedar Falls, Iowa.

The increasing use of photography is apparent in the technological world today. We are surrounded by visual images that may attempt to inform us, promote sales, or enhance individual pleasures through leisure activities. One aspect of photography, making color prints from color slides, is an activity that is no longer limited to the custom laboratories.

A variety of materials are available for use in making color prints and these may be purchased in small quantities for home darkroom use. Some brands of chemistry are designed to be used with Kodak Ektachrome Type 1993 (TM) paper. (At this writing, Kodak is phasing out Type 1993. It will be replaced with Type 2203 and compatible chemistry will be available.) Other brands of chemistry must be used with a paper of the same brand. Before purchasing any materials, check on the availability of particular brands and determine the cost per print of the different brands. Cost per print is the total cost of paper and chemistry divided by the number of potential prints.

After obtaining the necessary paper and chemistry, you will need a standard darkroom and equipment. A typical black-and-white enlarger will do an acceptable job for color printing. Color enlargers with built-in color filtration are available at resonable cost on today's market. If no color enlarger is available, you must purchase a set of color printing filters for use in the enlarger.

Color printing filters are designed to be used between the enlarger light and the enlarger lens. These filters will allow you to change the color of the final print to obtain required quality. Filters are available in complete sets including a UV filter. It is recommended that they be purchased in a set as opposed to individual selection.

Other standard darkroom equipment includes an accurate timer and thermometer. The timer should include both minutes and seconds. One timer can suffice for both exposing and processing. The thermometer must be accurate and should be tested, if possible. All thermometers are not accurate nor consistent. A mercury thermometer is recommended for fast readings. Do not use the plastic encased mercury thermometer for color printing; the reaction time for this type is too slow. The dial type thermometers are good but the metal probe must be immersed approximately 2/3 of it's length to obtain a correct reading. Merely dipping the end of the probe in solution will not suffice.

One additional piece of equipment is highly recommended for color printing; the color print processing drum. The drum offers a number of advantages over standard tray processing. After exposing the paper in the enlarger, the paper is loaded into the drum and sealed. You can work under normal room light to process the print because the drum is light tight. Tray processing must be done in total darkness. No safelights can be used. Another advantage with the drum is consistency in processing. A specific amount of chemistry is poured into the drum for processing and discarded upon completion. The drum is designed to function on a minimum amount of chemistry so waste is virtually nonexistent and since fresh chemistry is used each time, print consistency is maintained.

Different size drums are necessary to accommodate larger prints. Larger drums will handle both large prints and smaller prints. However, the large drums may require more chemistry, even for the smaller prints therefore increasing the cost of processing per print.

After gathering the necessary materials and equipment, the first step is to mix chemistry. Follow manufacturer's recommendations and instructions exactly. Storage of chemistry in clean polyethlene bottles is recommended. Check for recommended mixing temperatures and, if possible, mix the chemistry at the processing temperature if you are going to use it immediately.

Maintaining the correct processing temperature is one of the "absolutes" in printing color. A number of methods are readily available to control the temperature of the chemistry. One of the most simple methods is the water bath system. The mixed chemistry is stored in capped bottles and the bottles should be placed in a running water bath that will maintain the chemical temperature. Use a container deep enough to cover the level of chemicals inside the bottles. The water bath will have to be one or two degrees higher than the required temperature of the chemistry.

A second simple method of maintaining chemsitry temperature is to purchase an aquarium type heater and use it to heat the water bath. It will be necessary to experiment with the heater to find the correct adjustment.

Next, check the basic filter pack information on the back of the paper package and place those filters in the enlarger. This is a correction determined by the paper manufacturer for that batch of paper.

Place a slide in the enlarger. Choose one of normal density and one containing color you are familiar with for color comparison later. Open the lens wide open, crop, and focus as necessary. You are now ready to expose the test print.

Turn off all lights, including safelights. Place a sheet of paper in the easel and expose one quarter of the paper for ten seconds, another quarter for twenty seconds, the third quarter for forty seconds, and the final quarter for eighty seconds. Place the paper in the drum and put the lid on. Turn on the lights. Process according to instructions and dry the print with a hair dryer. It must be completely dry before you can evaluate it.

Determine which quarter of the print has the best density, not color. After making this decision, only then can you make any decision concerning color. It is recommended that a color balance chart be consulted. The color balance chart may be furnished with the instruction booklet or they may be purchased separately from a photo supply.

It is absolutely necessary to make one good quality color print by trial and error before continuing with other attempts. When you achieve a quality print, you will know the filter information, exposure time, and aperture for that print. Write it down. This information is a starting point for additional prints exposed from similiar density slides and film types.

Obviously, there is not enough space here for a complete course in color printing. Anyone attempting color printing should be familiar with the basic equipment and materials in the darkroom. Black-and-white processing experience is not a necessity, but it helps. It is imperative that the manufacturer's instructions be followed exactly when starting this process. By eliminating unnecessary variables, you can control your technique. Your color control and print quality can be equal to custom lab processing if your are careful. Your savings can equal up to 90% of the lab cost.

AIAA. T-3:00 - 19

POWER MECHANICS IN THE MIDDLE SCHOOL.

Don Kelly, Industrial Arts Instructor, Brandenburg Middle School, Garland Independent School District, Garland, Texas

New developments in the fields of energy and power are coming about every day. With the emphasis on energy in recent years, the need to conserve and find alternate energy sources is demanding change. The new interest in solar power, changes in the internal combustion engines and extensive use of fluid power were brought about by these demands.

Industrial Arts should strive to encourage student understanding of basic changes in these fields. Many new energy sources are so recent that most are not covered in any state adopted textbooks. With the use of current articles and free literature, most energy sources can be briefly explained. The power companies and the U.S. Department of energy can supply you with some very up-to-date information.

The expense of most commercial produced trainers tends to prohibit any hands-on activities. These experiences are sometimes needed for students to fully understand the information and gain the basic skills necessary. If the instructor is willing to undertake construction and development, some trainers can be manufactured at a nominal cost.

The basic components of most any system can be bought either new or used. Miniature components may be purchased and the parts of a convertible car top can be used to teach hydraulics. Electronic supply shops sell photo cells at a low cost for construction of solar trainers and scraps from construction sites could be used to construct solar collectors.

Power Mechanics should be a study of man's attempts to harness wind, water, steam, electrical, solar, and atomic power to meet present needs.* Students should experience all aspects of power. Existing Power Mechanics courses need to be evaluated to determine if all aspects of power are included. With a little enthusiasm, instructors could infuse new energy developments into industrial arts courses without overextending their budgets.

Information on new developments can be obtained from:

1. Department of Energy (DOE) Technical Information Center, P.O. Box 62, Oak Ridge, Tennessee 37830
2. National Educational Council on Energy and Power, P.O. Box 618, Concord, Ma. 01742 (Energy and Power Journal)

FOOTNOTE:

* Wilber, Gordon and Norman C. Pendered. Industrial Arts in General Education, 1967. International Textbook Company, Scranton, Pennsylvania.

The addresses listed offer low cost software for all types of energy. Catalogs are available upon request.

American Association for Vocational Instructional Materials
120 Engineering Center, Athens, Georgia, 30602, (books & transp.masters)

Chrysler Corporation, Training Materials Department,
26001 Lawrence Avenue, Center Line, Michigan 48015

Cummins Engine Company, Incorporated, Columbus, Indiana 47201
(Diesel manuals & wall posters)

Energy Research and Development Administration, Technical Information Center, P. O. Box 62, Oak Ridge, Tennessee 37830 (free pamphlets on all types of energy sources and free loan films)

John Deere Distribution Service Center, Service Publications, Department 333, 1400-3rd Avenue, Moline, Illinois 61265, (safety, tools, hydraulics, engines with slides, transparency masters & tests)

Ford Service Publications Department, Service Training Aids, P.O. Box 07150, Detroit, Michigan 48207 (filmstrips on all types of engines & components)

General Motors Corporation, Public Relations Staff, Room 1-101, General Motors Building, Detroit, Michigan 48202 ("Aids to Educators" catalog lists booklets, charts, films, and resource materials furnished by GM, and its divisions)

Hobar Publications, 1234 Tiller Lane, St. Paul, MN. 55112 (small engine text and manuals)

Megatech Corporation, 29 Cook Street, Billerica, MA. 01866, (engines, trainers, books, on all forms of energy)

Technical Systems, Inc., 2256 Terminal Rd., St. Paul, Minnesota 55114 (Technical manuals, engines, trainers, dynomometers)

POWER AND ENERGY ARTICLES FROM RECENT PUBLICATIONS

Energy and Power Journal, January 1978

Industrial Education, February 1978, p. 42

Man/Society/Technology, February 1979, November 1978, p. 23

School Shop, February 1979, p. 38, December 1978 p.26, February 1978 p.42, October 1978 p.43, September 1978 p.14, May 1978 p.36.

Mechanics Illustrated, February 1979

FACTORY PRODUCED INFORMATION ON SMALL ENGINES

Briggs & Stratton Corporation, P.O. Box 702, Milwaukee, Wis. 53201
Jacobsen Mfg. Co., 1721 Packard Ave., Racine, Wis. 53403
Lawn-Boy, Service Department, Galesburg, Ill. 61401
Tecumseh Products Co., Parts Depot Division, Grafton, Wis. 53024
Teledyne Wisconsin Motor, Milwaukee, Wisconsin 53219

AIAA. T-9:00 -14
THE OLD AND NEW OF CLIMATE CONTROL. Max E. Kanagy, Teaching Associate
Department of Industrial Technology Education, The Ohio State
University, Columbus, Ohio.

Traditionally, power mechanics teachers have focused their classes on heat engines. In recent years IA teachers have been using energy/power as a course title or descriptor. The content of these courses suggested by Palumbo's energy, power, instrumentation, and control or Basmajian's energy sources, conversion devices, transmission, and storage and control has helped to broaden the content of many energy/power courses. Since the energy crisis of 1973, many IA teachers have included solar energy and wind energy in their energy/power classes. The alternative energy sources and energy conversion systems should be taught, but even this does not make full use of the broad base of energy/power courses.

This presenter's investigation of energy conversion devices has resulted in dividing energy conversion devices into primary and secondary groups. Primary devices with thermal energy outputs are heat engines, furnaces, and absorption refrigeration units. Furnaces are defined as heat producing devices, that may use fossil fuels, biomass fuels, or solar energy as the source of thermal energy. The output of the furnace may be a hot gas or liquid. By this definition natural gas or solar hot water heaters are both furnaces.

Secondary energy conversion devices with thermal output are electric furnaces, electric hot water heaters, compressor type air conditioners among others. Both primary and secondary thermal energy conversion devices that do not also have mechanical energy/output and are not solar powered are still being ignored by most IA energy/power teachers.

Logically, if we include solar furnaces in our energy/power courses we should also teach students about other devices that produce thermal energy. Wood stoves or fireplaces, fossil fuel fired furnaces, and air conditioners are all thermal energy producing devices worthy of study. These are old devices but new to most IA energy/power programs.

Specifically, air conditioners or heat pumps have an important place in energy/power classes. The student can be engaged in both vocational and general education activities. If a student learns to discharge, evacuate, and charge an air conditioner; he is learning vocational activities. The general education dimension is satisfied when the student learns how air conditioners operate; terms or concepts such as latent heat, sensible heat, humidity, air velocity, air density, pressure-vaporization relationships, specific heat, and enthalpy; and how to read a psychrometric chart.

In energy/power or power mechanics classes, we traditionally have not taught students how to determine the thermal energy in fluids or solids. The thermal energy of a mass is measured in British Thermal units (Btu) or joules (J). The change in thermal energy of a material varies, directly with its change in temperature, mass, and specific heat constant for that material. This relationship is given by:

$$^{1}\Delta Q = m \cdot C_p \cdot \Delta T$$

For a limited range of temperatures and one fluid, air, one can use the psychrometric chart for finding the change in thermal energy of a mass of air.

When one has a mass of air, e.g. the air in a room, the volume of air times its density equals its mass. The new form of the equation is:

$$^{2}\Delta Q = Vol \cdot p \cdot C_p \cdot \Delta T$$

In other situations one is dealing with air flow. The volume of a flowing fluid is the area of the duct or pipe, the velocity of the fluid, and the total time. This form of the equation is:

$$^{3}\Delta Q = A \cdot V \cdot p \cdot C_p \cdot \Delta T \cdot t$$

The specific heat (C_p) of water is one in both customary units (engineering) and metric (SI) measuring systems and .2404 (CV) and 1000 (SI) for air.

If one uses a known amount of energy, one can use this equation or the psychrometric chart to determine the efficiency of an air conditioner, refrigerator, wood stove or fireplace.

If one includes these types of energy conversion devices and the thermal energy equation in energy courses, the teacher will be able to help students understand the psychrometric chart, the conservation efforts for homes and industry, and why it's necessary to maintain refrigerators and furnaces in an appropriate manner. In addition he will be acquainting students with processes fundamental to our technological society.

The fossil fuel fired furnace or stove may be fired with different fuels but there is evidence that it along with the solar furnace will be with us for many years. It is important that we teach youth and adults about installing, operating, and evaluating stoves, furnaces, and air conditioners. The result should be a more energy conscious and technically literate public. All of this is well within the conceptual framework and generally accepted purposes of industrial arts.

[1] Where: ΔQ = change in thermal energy
m = mass
Cp = specific heat
ΔT = change in temperature

[2] Where: Vol = volume of fluid
D = density of fluid
Otherwise same as above (1)

[3] Where: A = area of conductor
V = velocity of fluid
t = time
Otherwise same as above (1)

REFERENCES

1. Hayes, E.T. "Energy Resources Available to the United States, 1985-2000." Science, 1979, 203, 233-239.
2. Reynolds, W.C. Energy from nature to man. New York: McGraw-Hill Book Company, 1974.
3. Trefil, J. "Woodburner Efficiency." Popular Science, 1979, 214 102-104.

AIAA TH - 9:00-10:15

MATERIALS PROCESSING TECHNOLOGY AT THE UNIVERSITY OF NORTHERN IOWA.

Dr. James P. LaRue, Professor, Jim Hoeksema, John Mockler, Dave Moyer, Instructional Assistants, Department of Industrial Technology, University of Northern Iowa, Cedar Falls, Iowa.

Spring semester, 1976, saw the birth of a new course "Material Processing Technology" in the Industrial Technology Department at the University of Northern Iowa.

Several years earlier the departmental faculty had decided to move toward a "new curriculum" which would embrace three dominant systems of industry: communications, power, and production.

Five months earlier the department had moved into a new building specifically designed to accommodate the new curriculum.

Material Processing Technology was designed to include the essential material from four trandtional courses: General Wood-3 SH, General Metal-4 SH, Industrial Plastics-3 SH, and Machine Tools-4 SH. The resulting 6 SH core course emphasized concepts of separating, forming, etc. (rather than areas) and scheduled students to meet 2 hours/week in a classroom and 8 hours/week in the Production Laboratory.

The course is team taught by two faculty members who are assisted by at least one graduate assistant, a full-time laboratory assistant, and a storekeeper.

The course is also conceptually organized into six units: measurement, layout, gaging-1 week; separating-7 weeks; forming-3 weeks; combining-3 weeks; conditioning-1 week; and finishing-1 week. Students receive 32 lecture presentations and are guided through their laboratory activities with numerous worksheets outlining tasks demonstrated by the instructors. Some tasks result in the students having gained experience in carrying out a process and not having produced anything of a useful nature. Other tasks produce component parts which culminate in useful products.

In addition, the course is competency based to the extent this is possible. Several examples follow: 1) Hands-on laboratory activities include tasks which are evaluated as students complete them. Many tasks involve no, or quite limited, skill. Such work is given a check to show satisfactory completion of the tasks and acquisition of the desired competency. Other tasks involving substantial skill are evaluated with a plus if the quality of the work is outstanding and a check if satisfactory. A task completed with insufficient success to show a minimum competency receives no credit until it is carried out successfully. 2) Three unit tests and a final examination are given. Students scoring less than C- on unit tests are encouraged to retake them after review. If a student scored an F on unit test one, retook the test and scored a B, the earlier F would be replaced by C-, which is the maximum one can earn by retaking a test, and 3) A number of operator tests are given. The score made on the initial attempt is recorded and becomes a part of the final course grade. If this score represents less than 90% accuracy, the test must be retaken until 90% accuracy is achieved before the student is permitted to use the equipment on an "as needed" basis. Not all students are able to demonstrate minimum competencies in all laboratory tasks and tests by the end of the semester. Since final grades must be assigned at that time, it must be admitted that competency-based instruction is more of a goal than a reality.

In recent years there has been much interest in repackaging traditional courses into broad, conceptually organized courses. Many departments desiring to move in this direction have been hampered by existent unit shop or general shop facilities. UNI has had an opportunity to try a new approach under near ideal conditions. The physical facilities were specifically designed to accommodate such a course, and members of the instructional team have approached their tasks with much zeal and enthusiasm.

The question is, "Has the course succeeded in proportion to the massive effort put forth and is it serving student needs better than the more traditional courses of a similar nature?" Material Processing Technology at UNI seems to have some definite advantages over traditional course offerings, however, serious disadvantages do exist.

Advantages include:

1. Students develop at least a minimum competency in using about 95% of the equipment in the Production Laboratory, and they become familiar with a wide variety of industrial processes.
2. Some duplication of instruction can be avoided. For example, in traditional courses the principles of band sawing would likely be covered in both the Metal and Wood courses. In Material Processing Technology the basic principles of band sawing can be handled in one presentation.
3. Many seemingly diverse industrial processes appear to be more understandable because of the instruction's conceptually organized framework.

The disadvantages are as follows:

1. A 6 SH course commits a large block of hours that may cause scheduling difficulties and if performance is poor, the grade point average is affected drastically.
2. The amount of assigned work and time limitations seem to overwhelm the slower students and prevent most students from developing expertise in anything.
3. The course covers a great deal of material; the addition of a new process is possible only if one that is presently taught is eliminated.
4. The necessity of covering sufficient material to guarantee an adequate number of work stations causes a time lapse between presentation and application and an undesirable "fade out" of learning.
5. Several important activities that require substantial practice time to develop minimum skills (such as welding) come too near the end of the semester for everyone to achieve at a desired level.
6. After demonstrations are presented, there is insufficient time for students to complete their work during the scheduled class time.
7. The generally less familiar and somewhat more sophisticated Metal and Machine Tool equipment require more instructional time with the result that the areas of Plastic and Wood appear to be of lesser importance.
8. Some advanced courses would prefer part of Material Processing Technology as a prerequisite, but cannot afford the entire six semester hour package.
9. The breadth of material covered in the course almost requires that a team teaching approach be used. This suggests that courses be large which makes it difficult to get to know the students.
10. Students have a number of people to go to for help. They don't always get one that can be of direct assistance.
11. Team teaching requires additional teaching manpower.

In general, although more disadvantages than advantages are listed, it is believed that Material Processing Technology has become a valuable portion of the curriculum at UNI. Suggestions as to how this course might be improved are solicited.

AIAA. T-1:00-18
KNIFE MAKING. Marvin Henry,
Instructor, Maywood High School, Maywood, Nebraska

Welcome to the wonderful world of special interests in Industrial Arts. We as shop teachers really are very fortunate. The very nature of Industrial Arts appeals to many. Others become interested when they see the end results of shop classes. There are very few areas of the school that can attract students and develop interest to the degree that Industrial Arts does. Each student works on his particular interest and at a rate of speed suitable to him and a given situation.

The first popular style was probably like an 8" straight blade. The next popular idea was a 6" Arabian style blade. After that the ideal knife was a long, pointed 4" blade. This has been shortened to a 3" now, and is a drop point. Fast gaining popularity is a 3" folding knife or a large single blade pocket knife. This is the knife of tomorrow. Our students see these knives as useful instruments or necessary tools for certain jobs and not as weapons.

1ST STEP: Draw a cardboard pattern the exact shape and size of the knife you want. 2ND: Cutting torch cut spring longer than cardboard pattern. 3RD: Annealing heat red hot. Pound spring flat on anvil or something solid. Heat again to red hot. We put in asbestos sleeve and then put in wooden box filled with pour insulation. 4TH: Use soap stone and draw pattern on the blade: Several methods can be used now. We now use the cutting torch to rough cut, then grind to size and shape of pattern. Do not stick in water to cool as it will reharden. Cools quite fast at room temperature. We have just used the grinder, but takes a longer time and is hard on the wheels taking off that much metal. We also have used a metal cutting band saw, work very fast, but after about two blanks the blade is shot. Very accurate method can saw right on the mark. 5TH: Use a wide stone and grind until one side is bright and no pits left. We then rough file that side and follow by draw filing, that is, hold file at right angle to work and push file back and forth. Cuts very fine, but is slow. 6TH: We then grind other side until bright and pits are gone. We continue grinding until approx. 3/16" thick. Check with calipers. By moving it around, you can detect thicker spots. Then rough file and draw file as before. 7TH: Use magic marker and draw lines for the bevel on top and cutting edge. Draw a line down middle of blade. Start filing by working up to bevel, down to middle line and back toward the hilt. The thing to aim for is to get to all three lines at the same time. Then continue working toward point. Try to keep bevel flat. When flat, and to the point, draw file the entire bevel. Do same on the other side. If marks get rubbed off, just re-mark. Important to always have marks to guide by. Rough file and draw file a slight bevel on top edges. This makes the blade appear thinner. Draw filing with swiss file helps. 8TH: Taper tang both ways by grinding. It needs to be larger at the hilt. This makes it very easy to get a near perfect fit on the hilt every time. Now you put in your blood groove if you want one. Using moto-tool grind this in by making a guide from a 3/4" piece of wood and holding moto-tool with the depth gauge used against the block of wood. The block of wood needs to be the same shape as top of blade if groove is to be parallel to back edge. 9TH: Blade is ready to sand now. We use 120 grit emery paper then 280 grit wet or dry. Polishes fairly easy now because blade is soft. Polish one direction until all marks are going in the same direction. Change direction and polish until all marks go that direction. If not enough, some marks will not change directions. 10TH: Harden and Temper 2 step process. Hardening - dip in oil. If in doubt know the composite of the steel. Possible to use water. Car spring steel is too hard for water. Crack cutting edge and corners of tang. Very brittle. Now, will chip. Temper - Process of leaving the hardness in and removing brittleness. We put in oven in Home-Ec room at 325 for six hours. Very important to be sure the metal gets to a uniform temperature all the way through. Sometimes, when hardening, the blade will bend back to shape of the spring. Clamp to a stiff piece of metal, using clamps bent to the same degree in opposite direction and go through the tempering process again. Will come out straight now. Old timers would harden and temper in about five minutes. They would harden as above then scratch until some shiny metal showed up. Then would re-heat the back edge of the knife until a pale straw brown-yellow color would flow to cutting edge, then quench in oil again. When the knife comes from the oven you will see the pale straw brown-yellow color here and there about the blade. 11TH: Now the blade is ready to repolish. It sands a lot harder now. Use 280 grit and polish until all lines go one direction. Use 500 grit and polish until all fine marks go one direction. Use jewelers rouge for steel and polish until bright on a buffer or grinder with buffing wheel. A 3450 RPM grinder works well. 12TH: Drill holes in hilt then using swiss files, smooth into a rectangle and fit by trial and error method. Tapping it the last ½" or so, you can lay on the anvil and tap on hilt to form fit for better job. Spacers are made the same, by drilling holes smaller than thickness of tang and filing out. Not necessary to fit quite as tight. 13TH: Style of handle and materials used: ebony spacer, rosewood handle, ebony butt, aluminum spacers and hilt, brass spacers and hilt, inlets in handle, ivory. Notching Tang, length of tang, one piece handle, multi-piece handle, cast aluminum. Inletting pieces for multi pieces, one piece. Glue pieces on using epoxy. Centering blade in handle: sawing to shape, contouring side, top, rounding corners, shape hilt end, shaping butt. Making finger grips: Draw around fingers to hand fit, work until comfortable, sand, polish, finish, sharpness - split - newspaper.

AIAA. T- 1:00-2:30

NON-THREATENING SUPERVISION. Douglas Militzok Ed.D., Town-Wide Supervisor of Industrial Arts Education. West Hartford Public Schools, West Hartford, Connecticut.

Supervision is a process that we as industrial arts educators deal with constantly, but rarely talk about. We have ample opportunity to read about a variety of programs affecting industrial arts, including: curricular models, new ways of integrating disciplines, mainstreaming, safety, etc., but we never read about how we can improve our classroom instruction. After all, the improvement of classroom instruction and the ultimate improvement of the student learning process has to be at least equal in importance to a new approach to power and energy. If we as industrial arts educators are interested in improving our classroom instruction we need to read publications like Educational Leadership or the Kappan. When we attend the national or state industrial arts conventions, we never have the option of attending a special interest workshop on supervision or the improvement of instruction. The reason that this situation exist is not hard to understand. Curricular innovation can be initiated and accomplished by the individual teacher in his own classroom. No one else need be involved, no real risk is at stake. The final evaluation rests with the teacher and possibly some of his peers. If the innovation fails to produce the desired results, it can always be rationalized that the resources were insufficient, the internal structure of the school building prevented success, etc. Supervision on the other hand, conjures up thoughts about a process that can include: the involvement of others with potential lethal consequences, increased anxiety, risk oriented, time consuming, and one that may not have produced the desired results in the past. Rather than leaving this important topic in the confinds of the closet, let's be more realistic and bring it out into the light; where we can develop a better understanding of the process, with all its strengths and weaknesses.

We need to begin our examination of supervision by asking ourselves how do people learn to be teachers? Unlike most professions, we learn to be teachers by imitating examples of teachers from our own education. Our parents were our first teachers. They taught us right from wrong, how to dress, what foods to eat, etc. We picked up these teaching styles and began imitating and practicing them on our younger brothers and sisters. Thus, our teaching behavior began to be formed. At about the age of five, most of us began our formal education and continued until we were twenty one or twenty two. Add graduate work to the four year Bachelors degree, and we might have spent twenty years in school, during which time we learned informally what the models of teaching are. We learned what a teacher is, in about the same way as we learn how to be a parent. That is, we pick it up by living; by being in it six hours a day, for one hundred and eighty days a year, for twenty years. As a result, when the teacher comes to the professional portion of his education, that portion that is specifically designed to give him a push that will make him a teacher, he gets about thirty credits of professional education(of which six or eight are generally student teaching). How much chance does one have of changing one's child rearing habits through thirty hours of collegiate instruction? Continuing this thought to our professional teaching, how much change do you think your principal or supervisor can make in how you treat students, with his one or two yearly visits to your classroom? I submit that it would be the rare occasion, rather than the rule, that classroom instruction would be improved through this traditional form of supervision.

What is needed is a different form of supervision. One that will provide for systematic, in-class assistance for teachers over a sustained period of time. One that will approach the improvement of instruction in a truly professional manner and will take place between two professionals(teacher and supervisor), each of which having equal status vis-a-vis the other, and each having some personal investment in the planning of new teaching strategies. One that will be devoid of evaluation(as much as possible), and based upon mutual trust. I believe that Clinical Supervision can be that form of supervision. It can, by creating a very special environment, provide the necessary input that can help teachers replace the safe and comfortable way of teaching we know so well(only where desirable, and decided upon jointly), with new and untried patterns of behavior.

A Clinical Supervision Cycle is time consuming, in that it takes the better part of one full day to complete. It includes the following components:

Phase 1. Establishing the teacher-supervisor relationship

The first phase of Clinical Supervision is the period in which the supervisor:

A) Establishes the clinical relationship between himself and the teacher.
B) Helps the teacher achieve some general understandings about clinical supervision and a perspective on its sequence.
C) Begins to induct the teacher into his new role and functions in supervision. This is done well in advance of the first observation.

Phase 2. Pre-observation Session

The purpose of this session is to inform the observer(s) what he will see when he enters the classroom. More specifically, the intent of the lesson and the strategies that will be used to reach the objectives of the lesson.

Phase 3. The Classroom Observation

The purpose of the observation is to collect objective data about what went on in that class that day. The recording instruments are used to register directly observable actions and interactions of pupils and teacher. Recording instruments vary from a video recorder, to a tape recorder, to ordinary pencil and paper.

Phase 4. The Strategy Session

The purpose of this session is to organize the raw data collected into specific teaching patterns and then identify the data that will substantiate these patterns.

Phase 5. The Conference Session (Analysis of Instruction)

During this session, only the supervisor and the teacher will engage in analyzing the lesson. The supervisor usually begins by laying out a pattern and proceeds by discussing it with the teacher. The discussion may shift to different topics, or a new pattern may be laid out when the original discussion runs its course.

Phase 5. The Post-Analysis Session (Analysis of the Supervisor)

This session can only take place if a supervising team was involved in the cycle. During this session, the supervisor is put on the "hot" seat and is asked why he said this,or asked that question during the conference. In this way, the supervisor has an opportunity to improve his skills in conducting clinical cycles.

ACIASAO. W-9:00-18
TECHNIQUES OF CONDUCTING STATE INDUSTRIAL ARTS FAIRS. James O. Parnell, assistant professor, Department of Industrial Sciences, Colorado State University, Fort Collins, Colorado.

In planning a state industrial arts fair, major hassles can result from lack of planning. Organization is a must. Following are some suggestions as to how to go about planning and organizing.

First you must develop a flow chart of activities. Decide what needs to be done, by whom, and when it must be accomplished. Early faculty involvement is advisable, and later students will be more involved with committees and work.

Second, arrange for physical facilities for the fair. Get someone in charge of facilities to agree to let you use them a long time in advance--preferably a year. You may be able to use a facility for no rental charge. Other physical arrangements to consider include floor covering, speaker system, some manner of handling trash, arrangements for parking, and a teacher's lounge.

Third, set up committees. Good committees can take a lot of pressure off the one or two people who actually run the fair. A suggested list of committees is: (1) The Faculty Committee which is composed of the home faculty of the institution sponsoring the fair. They serve as a governing board, supervisors of the fair, have the final responsibility for the success of the fair, and can make important contacts; (2) The Judging Committee must select, contact, and inform judges; (3) Set-up and Clean-up Committee locates halp for setting up and cleaning up the facility; (4) Publicity Committee handles newspaper, newsletter, and radio releases; (5) Awards Committee orders ribbons, trophies, and sees that they are there on time. It also assists in the awards presentation; (6) Concessions Committee may be a money-making project for the student club; (7) Placement Committee is responsible for deciding where each division will be positioned in the facility; (8) Security Committee must be responsible for the protection of the projects at all times during the fair.

Fourth, set up a budget. Identify the source and amount of funds which will be available to you. Consider the following as components of a good fair budget: (1) Printing and mailing, a large expense, includes mailing rules and posters to all IA teachers in the state in early fall, programs to show divisions and information about times, awards, the facility, and the fair; (2) Set-up personnel, if necessary; (3) Supplies; (4) Film and developing costs; (5) Awards, a major part of the budget, might include sweepstakes plaques, division plaques, individual awards, and ribbons. Ribbons might be awarded by judges on the following basis: 10% blue, 15% red, 25% white, and 50% green. The green ribbon is for participation, and every student gets a ribbon.

Fifth, developing rules is a major task. It is a good idea to send the complete rules of the fair, including dates, places, who is eligible, with a cover letter and poster in the fall. Resolve problems of eligibility concerning age, level, and overlap with other subject courses. Consider four levels of competition according to grade: (1) 7th and 8th grade, which may sometimes include 5th and 6th grades if it is a middle school; (2) 9th grade; (3) 10th grade; (4) 11th and 12th grades. Divisions can be established from input from teachers to suit the needs of each state.

Sixth, publicity items to be arranged for include newspaper, radio, and television coverage. Entry request letters should be sent to every teacher in the state about six weeks before the fair. This letter would provide time changes, if any, updated information for the fair, and tear-off forms for entry requests. The entry form can provide an ID for the project, a claim stub for checking out the project, and recording and control for the judging process.

Seventh, project handling is a large responsibility. It begins with check-in desk and fee collection, if an entry fee is charged. This fee should cover the cost of ribbons and trophies. Involved in the handling of projects is the placement of divisions in the facility, which should be clearly labeled but capable of being shifted when necessary. Locked cases for small, expensive items, ropes for roping off all project areas, and "DO NOT TOUCH" signs are essential. Door checks must be in effect at all times.

Eighth is judging. Judges must be selected and notified far in advance as to the division, class, and grade level they will be judging. It is good to emphasize that these are STUDENT projects, not professional ones. Judges may be chosen from business and industry, industrial arts supervisors and college and university staff, in and out of state, and craftsmen, some of who practice their art as a hobby. It is a good idea to provide dinner for judges before the judging.

Ninth, tallying and selecting for awards must be done with great care and accuracy. Tallying should be done by staff members who are non-judges. Totals may be on the following point basis: blue ribbons = 5 pts., reds = 3 pts., whites - 1 pt., and greens = 0. The outstanding schools are those receiving the most total points in at least two divisions. The outstanding division awards are given to the schools with the greatest number of points in a single division. It may be desirable to set a minimum score for the division awards.

Finally, followup activities should include thank-yous to judges and requests for suggestions from the students and teachers.

In an effort to compile as complete a record as possible for those who may be running the fair years from now, make folders for each of these areas. Include samples and photographs of everything possible, even sign-up sheets and notes from past experience. Also, make a folder for each committee, with a complete flow chart of activities and bits of advice and experience. These folders are even more helpful if they include suggestions from the past year's committee chairpersons.

The last task after each year's fair is to begin the plans for the next year's fair. As many persons as possible should be given the same responsibilities for the next year. If new persons are needed, they will require almost a full year to prepare and get organized. Remember, good plans and organization will overcome many problems.

AIAA. Wed-3-4:30

CETA/YEDPA LEGISLATION-IMPLICATIONS FOR ARTS PROGRAMS.

GREGORY PETTY, assistant professor, Practical Arts and Vocational-Technical Education Department, University of Missouri, Columbia, Missouri.

Each year Congress allocates federal dollars for CETA programs. This year (FY' 79) much of this money will be spent on youth programs. We are constantly being reminded of the youth unemployment problem and yet many legislators and citizens argue about the proper approach. However, the cold fact is that taxpayers are indeed paying a very high price for youth programs. It is clear that educators should be bearing the load of job training. Unfortunately, many vocational programs are too specialized and costly for the young person who just wants a job. The implication made in this presentation is that Industrial Arts can provide the job preparation and training required of many of these unemployed youth.

The Youth Employment and Demonstration Projects Act of 1977 (YEDPA) was developed to enhance the job prospects and career opportunities of young people to allow them to secure unsubsized employment; to provide opportunities for youth to learn and earn which will lead to meaningful employment problems of youth and the immediate difficulties of youth in need of and unable to find jobs.

Of the four programs under YEDPA the one most appropriate for industrial arts educators is the Youth Employment and Training Program (YETP). The following quotation was taken from *Improving Job Opportunities for Youth*: *A Review of Prime Sponsor Experience in Implementing the Youth Employment and Demonstration Projects Act*. "Under YETP, prime sponsors are giving much attention to *career exploration* for youth through actual work experience and through more structured occupational information channels. The accent on placing youth in career-related jobs is proving to be impractical. Some youths have not thought about career plans. Others have either, what might be considered unrealistic plans, or plans for jobs that do not fit in with the youth jobs that are available. The emphasis on career-related jobs is also premature for many youths, in the sense that they have only the vaguest notions about the world of work. Before they can appreciate the differentiating details of different kinds of jobs, they need to understand the common requirements of all jobs.

"On the other hand, *vocational exploration classes* and counseling seem to be more effective mechanisms for providing exposure to different career options. *To the extent that career exploration is emphasized, prime sponsors should be on work experience that teaches, at a minimum, basic work habits, and the importance of those habits.*"

YETP is intended for unemployed and underemployed youths from families whose current gross family income is less than 85 percent of the BLS lower living standard. Up to 10 percent of YETP enrollees can be from families exceeding the income threshold, if they are part of an experimental, mixed income group. Additionally, prime sponsors have been encouraged to identify significant segments of the target population for special attention.

YEDPA has programs that deal with almost every population of young people. Included in this are in-school, out-of-school drop-outs, unemployed, underemployed, sex stereotyping and others. Industrial arts can be an integral part of many of these programs depending upon the energy and vision I.A. teachers and supervisors.

General knowledge is important to a large number of CETA youth. Besides basic reading and math skills "general knowledge is basic world of work skills. Most CETA youth participants have never had any kind of job before and may not have traditional parental work models. Basic world of work skills will provide them with the "general knowledge" needed to get and keep a job.

Vocational Exploration can be served most efficiently by industrial arts. Vocational Exploration Programs (VEP) are specific programs offered under YETP which offer career exploration into private industry. Much of the recent knowledge development reports are suggesting that a structured laboratory setting will more efficiently offer VEP. This could be a two hour session conducted after school in the industrial arts laboratories. VEP funds will pay extra training cost, materials used, as well as participants allowances and the instructor's salary.

In October 1977, the jobless rates for blackand white teenage dropouts were 51.1 and 20.7 percent, respectively and 32.8 and 11.6 percent for black and white high school graduates not in school. While these statistics may reflect many variables affecting our country's young people, one point is clear; a lot of young people are unemployed.

It is the intent of President Carter and our Congress to provide a long range "world of work" preparation for the Nations unemployed youth. Fortunately in the past few years we have had a relatively low and stable overall unemployment of 6 to 7 percent. However, in 1977 when the unemployment rate as a whole was 7.0 percent, it was 17.7 percent for teenagers and 10.9 percent for 20 to 24 year-olds. Industrail arts education can serve the needs of both the unemployed youth and industry. Many of the jobs taken by the economically disadvantaged youth cannot get even an assemble line job because they do not score high enough on the mechanical protions of employment screening tests. Of course, placing the disadvantaged youth in industrial jobs not only helps the individual but the industry as well. American industry needs a good labor force. Many of the jobs in industry are unskilled or semi-skilled and most companies are always looking for good workers.

If you decide to become involved with CETA youth programs, contact your local prime sponsor, then: 1. Tell them you're interested 2. Determine their needs 3. Assess your capabilities 4. Develop a program, two hours after school or six during the summer. 5. Utilize your talents and laboratory. Your participants will be paid the minimum wage for attending your training sessions. This will help guarantee attendance and interest. Design career exploration activities that will maximize your laboratory facilities. If participants get "out of line" or have poor attendance, terminate them. After all, an employer would do the same.

Funding is available but you must take the first step.

CETA funded youth programs are not for everyone. Most people don't want the hassle. However, it can be a good source of extra training funds for equipment and supplies (watch the regulations), and extra money for the teacher, including summer work. More importantly, you will be serving your community and the young people within your community.

It does seem easy and it is, but federal programs have many rules and regulations. It is important that you develop good rapport with your funding agency to prevent misunderstandings or violation of regulations.

AIAA. TUES-1-5

ALBERTA KIDS ALBERTA ADVANCED EDUCATION AND MANPOWER. Clarence H. Preitz, professor, Department of Industrial and Vocational Education, The University of Alberta, Edmonton, Alberta.

Advanced Education was formally established as a provincial department of the educational system on June 2, 1972, when The Advanced Education Act was proclaimed. The Manpower Act, 1975, transferred manpower responsibilities from the Department of Manpower and Labour to the renamed Department of Advanced Education and Manpower.

Advanced Education has both "institutional" and "non-institutional" capabilities for the delivery of instruction or training to respond to the provincial manpower requirements and occupational trends.

Within the institutional delivery system there is a subsystem that consists of institutions that provide post secondary non-university education or training and institutions that provide post secondary university education or training. This institutional delivery system consists of 22 public institutions and a number of licensed business and trade schools.

Of these 22 institutions four are vocational centres, referred to as Alberta Vocational Centres, located throughout the province. Programs at these Centres vary in length from six weeks to a maximum of 40 weeks.

There are eight public colleges that offer a wide variety of one- and two-year career oriented programs and in some instances the first and second year of several university transfer programs. These colleges are supported by the province through operating and capital grants, and their programs are coordinated under policies administered by the Minister of Alberta Advanced Education and Manpower.

Three of the 22 public institutions are regional colleges which offer programs that relate to agriculture and to the agricultural industries.

There are two polytechnical institutions which offer full and part time training programs in technologies, trades, applied arts, fine arts and medical science, as well as correspondence and continuing education courses.

The Alberta Petroleum Industry Training Centre provides physical facilities and instructors necessary for the presentation of courses in the various aspects of oil well drilling.

Alberta has four universities that provide a full range of programs at the baccalaureate, professional, masters and doctoral levels. In addition, each institution is strongly committed both to research activities as well as community services.

The Banff Centre is a non-degree residential institution with constituent schools of fine arts, management studies, environmental studies, and language studies.

Alberta has a number of non-profit private, religious affiliated colleges established by Private Acts of Legislature. These colleges offer university transfer courses, and receive financial assistance through operating grants from Advanced Education and Manpower under the provision of The Colleges Act.

Non-institutional delivery subsystems of the Manpower Services Division are the responsibilities of the Apprenticeship and Tradesmen's Qualifications Branch of the Division.

Apprenticeship is usually distinguished from on-the-job training programs by the greater length of the training period and by the formality of the apprenticeship agreement. Apprenticeship in Alberta is a formal system of training that is given strength and legal status by

Acts of the Provincial Legislature and supported by provincial rules and regulations that are approved by the Lieutenant-Governor in Council.

The majority of the 39 apprenticeable trades in Alberta require that the apprentice have a minimum of grade nine education or pass a prescribed entrance examination. Some of the trades demand that the apprentice achieve a higher level of education before starting on an apprenticeship. All apprentices must be at least 16 years of age and be employed with an employer who is a journeyman or who employes journeymen.

Apprenticeship programs vary in length from two to four years depending on the trade and on how much credit is given for high school vocational education courses or previous experience.

Apprenticeship is a long term program of training of progressive on-the-job (practical) learning experiences combined with classroom study of related technical topics (theoretical).

Normally, 2,000 hours per year are devoted to practical training. This will depend on the program.

The theory portion of the trade is taught at the technical institutes and includes related mathematics, science, drafting as well as special shop courses. Generally, the 2,000 hours of practical training is supplemented by four to eight weeks of in-school training, where after each period of classroom instruction an examination is written. The results of these examinations, along with the employer's assessment of progress on-the-job, are used by the Apprenticeship and Tradesmen's Qualification Branch to rate the performance of the apprentice.

Before a journeyman's certificate is issued by the apprenticeship branch, the apprentice must write and successfully pass both a practical and a theoretical examination.

In 1958, provincial apprenticeship authorities in cooperation with the federal government implemented the Interprovincial Standards Examination Program. Its purpose was to establish uniform apprenticeship trade standards and examinations throughout Canada.

To secure an Interprovincial Red Seal the individual must have a journeyman's certificate and receive a passing mark on the Interprovincial Standards Examination. Once a journeyman has an Interprovincial Red Seal affixed to his journeyman's certificate it is recognized in all receiving jurisdictions.

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1. Broad, T. W. "A Systems Model for Apprenticeship Training." Unpublished M.Ed. thesis, The University of Alberta, Edmonton, Alberta, 1970.

2. Yee, Tony L. "A Description of the Procedures Used for Civilian Accreditation of Military Occupations in Canada." Unpublished M.Ed. thesis, The University of Alberta, Edmonton, Alberta, 1977.

3. Alberta Advanced Education and Manpower. "Annual Reports - 1972, 1973, 1974, 1975, 1976, 1977." The Queen's Printer, Edmonton, Alberta.

AIAA. TUES-1-5

ALBERTA KIDS THE ALBERTA PLAN TEACHER PREPARATION. Clarence H. Preitz, professor, Department of Industrial and Vocational Education, The University of Alberta, Edmonton, Alberta and J Brian Andrus, industrial arts teacher, Stony Plain Junior High School, Stony Plain, Alberta.

Historically in Alberta, industrial arts teacher education can be traced to the Calgary Normal School where in 1907 a program of manual training was added. In 1945, a Faculty of Education was established at the Calgary campus of the University of Alberta, and the industrial arts teacher education program of studies was added. This program continued at the Calgary campus until 1963, when it was transferred to the newly established Department of Industrial and Vocational Education of The University of Alberta.

All laboratory courses in the department, whether concerned with materials, tools and processes or the technologies are organized as multiple activity laboratories where learning activities which illustrate the interrelationships of the functions of man-materials-tool-processes or man-technology are taught. These interrelationships are learned by students as they manufacture or construct a product from an organic or an inorganic material; or as they perform an experiment; or as they learn through simulation.

The emphasis in a multiple activity laboratory is on the learner and not on the teacher. In this environment there is a drastic role change for the teacher to that of a resource person, instructional material designer, manager of the learning environment, and a motivator of the learner.

The academic year of the University is semestered. To fulfill the requirements toward a baccalaureate the students must successfully complete 40 half courses for a total of 120 credits in eight terms or four years. These eight terms are divided into the following three developmental phases: content - terms 1, 2 and 3; synthesis - terms 4 and 5; and application - terms 6, 7 and 8.

Content Phase (terms 1, 2, 3). There are six laboratory courses where the student learns skills at the use level to work with the materials, tools, machines, and processes and acquires concepts associated with the basic technologies prevalent in a productive society. These content courses form the foundation for the advanced courses that a student will take in terms 6, 7 and 8. All industrial arts laboratory courses are six hour courses, taught by department personnel in laboratories of the department.

One of the junior level content phase courses is a drafting course where the students develop psychomotor and other attendant skills needed to produce mechanical drawings.

Two of the six content phase courses are materials courses and are oriented and designed so that university students develop a use level of skills with the hand and machine tools used to process either organic or inorganic materials.

There are three technology-oriented junior industrial arts content phase courses. These are designed so that the students develop the necessary knowledges, understandings and attitudes needed to work without fear or apprenhension in the technology being studied.

Synthesis Phase (terms 4, 5). Previously acquired skills, knowledges and understandings that were developed in Materials I, II and Technologies I, II and III, are brought together in a teaching methods course for industrial arts students. This synthesizing or integrating phase of the program provides the student with the opportunity to tie together what was learned in the content phase with what was learned in other required education courses.

Application Phase (terms 6, 7, 8). Terms 6, 7 and 8 of the eight term four-year program are the application phase. In this phase of the program the student has a number of senior elective courses in both the Materials and the Technologies that will permit the student to develop a better depth of competency through a greater definition of learning activities.

Graduate Studies. The following graduate programs are offered by the Department of Industrial and Vocational Education at The University of Alberta: Graduate Diploma Program; and Master of Education Program, with thesis or non-thesis.

Graduate Diploma Program is administered by the Faculty of Education. Normally, the program consists of a total of eight half courses. All courses must be taken at The University of Alberta and be completed within four years of the date of admission. Graduate courses taken toward a Graduate Diploma usually are transferable to a Master of Education program.

The Faculty of Graduate Studies and Research, The University of Alberta, is the administrative unit responsible for the overall administration of graduate studies.

The normal Master of Education Program with thesis is 10 half courses, a non-credit seminar, plus a thesis. Of the 10 half courses, half must be taken in the department. Students who complete a thesis must defend their research before an oral examining committee.

The non-thesis Master of Education program is usually made up of 12 half courses, a non-credit seminar, plus a major project. Six of the 12 half courses must be taken in the department. Evaluation of the major project is made by the supervising professor, another member of the department and a member external to the department.

Candidates in either masters degree program have a period of four years from the time of admission in which to complete the requirements for the degree.

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2. Smith, John C. "The Development of Industrial Arts Multiple Activity in Alberta." Unpublished M.Ed. thesis, The University of Alberta, Edmonton, Alberta, 1973.

3. The Department. Information for graduate students registered in the Department of Industrial and Vocational Education. The University of Alberta, Edmonton, Alberta, 1977.

ACIAS. TU-9:00-5

A REPORT OF CURRENT AIAA LEGISLATIVE EFFORTS AFFECTING INDUSTRIAL ARTS

Kendall N. Starkweather, assistant professor, Department of Industrial Education, University of Maryland, College Park, Maryland.

The Legislative Committee of the American Industrial Arts Association has been involved in activities during the past year regarding career education, our national congressional network, data collection talks, the National Advisory Council for Vocational Education, funding for vocational education, a leadership conference for supervisors of industrial arts, and a technology education study for exploring possible future directions which funding may be sought for industrial arts. Specific details of these activities may be attained from the AIAA national office.

Numerous implications and observations may be drawn from research conducted by the committee during the past two years. The implications are as follows: (1) educators in our profession are considering broader general concepts such as energy, materials, communications, manufacturing and production rather than the traditional specific areas of study; (2) educators in our profession would like to develop definitions, rationales, objectives and curriculum materials for technology education; (3) institutes and in-service activities are still considered popular primary methods of producing an upgraded educator in our field; (4) members of the profession are beginning to take more of a global (world perspective) look at the study of technology; (5) there continues to be a desire to implement technology activities into the elementary schools; (6) different aspects of industrial arts are now starting to influence the field more in such areas as economics, politics, technological assessment and positive/negative impact of technology; (7) interface between industrial arts/technology education with other curriculum areas is still an important consideration of the profession; (8) as technology continues to become more and more sophisticated, content in our field is being adapted to the many aspects of this sophistication while continuing to produce hands-on activities for all youngsters; (9) more demonstration projects are desired for all levels of the industrial arts profession; (10) the nature of industrial arts programs seem to be changing toward better interpreting industry and technology. Change with this goal in mind should be healthy for the profession.

IMPLICATIONS OF THE TECHNOLOGY EDUCATION STUDY TO LEGISLATIVE EFFORTS

Just as numerous implications of this study may be made for the profession, directions may also be developed for use by the Legislative Committee. Some selected directions are listed as follows: (1) the Legislative Committee members should pursue activities to bring these proposed directions into realities; (2) legislative efforts may be anticipative and productive in nature rather than purely reactive; (3) industrial arts programs should not be purely what the federal government proposes but rather what educators feel is important in programs; (4) the American

Industrial Arts Association members should start communicating various elements of this research to state and federal personnel throughout the United States. This is not only a job for the Legislative Committee, but for every concerned educator in the profession; (5) new areas of government should be contacted to gain assistance for the development of ideas behind technology education. Suggested agencies to contact include the Department of Energy, Department of Transportation, Environmental Protection Agency, Energy Research and Development Administration, etc. Relations should be continued with the American Vocational Association and United States Office of Education personnel to maintain the common goals that these groups have in producing a better education for members of our society.

AIAA Th. 3:30-4:30

INDUSTRIAL TRAINING METHODS. Robert E. Wenig, associate professor, Department of Occupational Education and Industrial Education, North Carolina State University, Raleigh, North Carolina

What makes training in the business and industrial sector so successful? First, two-thirds to three-fourths of all training and education beyond the high school level is done by business, industry, government, labor, and the armed forces. Colleges and universities only do about one-fourth to one-third. Second, industry (including all others) spends several billions of dollars each year to obtain short term (training) and long term (education) results from their employees' performances. Since industry's major focus is in achieving direct results from training a beneficial climate exists for using the best methodology.

Before proceeding, let us define several terms that will enable us to communicate more effectively.

Industry - provides goods and services for profit
Training - seeks a narrow range of behavioral responses
Education - demands a broad range of behavioral responses
Methods - a strategy for attaining desired results
Industrial Training Methods - those strategies that will enable persons to perform their job according to an identified resultant standard.

When industrial trainers are desiring results from training methodology, different questions are asked. That is, to obtain appropriate employees' behavior, one does not ask what subject matter should the individual be trained in, but what should the person be able to do on the job to achieve desired results.

The worth of industrial training is judged by gaining direct results while the educational institutional scheme comes indirectly from long term follow-up studies. Therefore, the formal educational sector should analyze industrial training methods and select those which can provide the greatest benefit for improving student performances.

The analysis of industrial training methods was performed by Lusterman (1977) when he surveyed 610 industrial firms having 500 or more employees. The results of the survey stated industrial training methods should stress:

1. Greater student involvement
2. Methods, course length, and curriculum to meet individual needs
3. More instructional media technology
4. Active participation of the learner
5. More practical instruction that is results oriented

Research on selecting industrial training methods was performed by Wenig (1978) in a telephone interview with pre-identified training and development experts from six well known American corporations. The best methods were given for managerial and technical hands-on training. They were:

For Managerial
Role playing, gaming, and assessment center
Incident process and case studies
Behavior modeling and lecture

For Technical - Hands-on
On the job training (OJT)

OJT was the best method of training with special supervisory techniques called coaching and counseling. The knowledge building part of the training occurred in special facilities called vestibules, skill centers, and/or classrooms. The special facilities were orientated towards individualized training with use of multi-media and personal instructors.

One of the most recent thrusts in industrial training that may hold the greatest benefit for industrial arts education is Behavior Modeling by Goldstein and Sorcher (1974) Behavior Modeling proponents state that the traditional approach to training by starting with understanding the theory, to changing attitudes, to altering job behavior, to achieving supervisory results has not worked. The new training process (Behavior Modeling) begins with the participant modeling the behavior through role playing and practicing that leads to superior results, which leads to changed attitudes, which leads to understanding of theory which explains effectiveness of the new behavior. The old went from theory to practice, the new reverses that process when it goes from practice (modeling) to theory.

One of the best organizations that can assist industrial arts educators is the American Society for Training and Development (ASTD). They have two outstanding publications titled Training and Development Journal (monthly) and the Handbook of Industrial Training.

Some of the major implications for industrial arts education are:

1. Greater communication and cooperation must be established between industrial trainers and industrial arts educators
2. Results oriented industrial training methods should be analyzed and used to improve industrial arts education
3. Industrial arts educators could benefit from joining ASTD organizations and/or becoming familiar with the organization, publications, and service.

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Lusterman, S. Education in Industry. (Conference Board Report No. 719) 845 Third Avenue, New York. 19771

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PLASTICS

AIAA. WED-1-2:30

A SYSTEM FOR DEVELOPING AN OCCUPATIONALLY BASED INDUSTRIAL ARTS PLASTICS PROGRAM.

Harry L. Hess, associate professor, Department of Industrial Arts, Trenton State College, Trenton, New Jersey.

Why should a plastics program be part of an Industrial Arts curriculum? How is the program developed?

The practical application of plastics with its beginning in the 1860's has developed into today's most spectacular growth industries. Regarding the growth, the Society of Plastics Engineers claims that plastics has the potential of becoming the major material used for all purposes in the next twenty years. Some historians claim we are entering an "Age of Plastics." With the student being born into this era, the relevant Industrial Arts curriculum must include plastics to prepare the student to live in tomorrow's plastics-oriented technological world.

How can the Industrial Arts teacher develop a relevant plastics program? He must develop it by asking and answering four basic curriculum questions: What is he going to teach? How can he determine whether what he selected is relevant? How is he going to teach the concepts selected? How can he determine whether the students can actually do what he said they would be able to do at the completion of the program?

These questions are answered by using the "Systems Analysis Curriculum Development" approach. This system was developed by Dr. Stanford Ruggles of Trenton State College. Dr. Ruggles, Mr. Roger Shafer, and this presenter used this approach to develop plastics programs.[1]

1. What are you going to teach? The plastics industry is constantly changing, thus the teacher must periodically analyze it to build course content. With the use of the Dictionary of Occupational Titles, all plastics related occupations are reviewed. In this publication, over 451 occupations can be found pertaining to the industry. A list is made of the 451 occupations.

2. How can you determine whether what you selected is relevant? Of the entire list compiled for plastics occupations, the teacher must analyze each occupation for job description and tasks. This is called a "task analysis." It is needed to determine what basic operational tasks are common to all plastics occupations and which ones should be taught.

Each action-type task is coded and listed separately on a card. A bundle of nearly 1,500 cards is created for these 451 occupations. At this point, one notices that for many occupations there are similar operational tasks. All of these tasks are separated into what may be called common operational tasks. This is done by placing all 1500 cards together and re-distributing them into clusters of common task units. For instance, synthesizing is an operational unit common to many of the occupations; consequently, all the cards related to this unit are placed together.

This process revealed 10 related units. These units cut across many occupations. The rationale for this procedure is that one cannot teach all 451 occupations, nor would this be desirable if one could. However, if common units are taught, then these common denominators would give the student mobility within many careers. Also, the student sees the "big picture" of the plastics industry and has a conceptual framework in which all of the smaller details can be placed. This analysis and synthesis does not represent groups of occupations, but rather basic functions of these occupations.

After the first-level units were developed, these 10 units were further broken down into second- and third-level concepts.

The next phase in the process is to translate the units into student performance objectives. This process focuses on what one wants the student to be able to do concerning the units under consideration. These performance objectives will vary with different age groups, abilities, and time alloted to each unit.

3. How are you going to teach the concepts selected? Once the performance objectives are written for each unit, the next step involves developing the teaching strategy that will best bring about the student behavior as indicated in the performance objective.

In addition, an instructional time line is developed in which the total number of days are allocated for each unit. Priorities are established; if little time is available for a particular unit then this time allocation would dictate that only those absolutely necessary concepts and sub-concepts are taught. This time allocation will also assure that a representative sample of activities is presented throughout the course.

4. How can you determine whether the students can actually do what you said they would be able to do at the completion of the program? Performance objectives in each lesson plan serves as the criteria for evaluating the students during the course. The guiding question is: Can students do what the objectives states he or she will be able to do as a result of the strategy used? A master chart of the student performance objectives is used and as each student completes the task, it is indicated under the student's name on the chart. Thus, a profile of each student is developed showing what specific performance objectives have been completed. This method may be used to develop any Industrial Arts plastics course and at any level.

FOOTNOTES

1. Hess, Harry L., Ruggles, Stanford D., and Shafer, Roger C. "A Polymer Curriculum Through Operational Clusters." Man/Society/Technology, March 1975. Washington, D.C.

AIAA. W-3-4:30

THE PLACE OF PLASTICS IN THE TECHNOLOGICAL WORLD OF THE FUTURE.

Michael R. Kozak, assistant professor, Department of Industrial Education and Technology, Montclair State College, Upper Montclair, New Jersey.

If industrial arts is to play an important role in learning for tomorrow, industrial arts teachers must consider technology as it is today and will be in the years to come.

Most producers and customer companies would agree that few new generic families of resins will be launched in the next five years. Instead, the future sees much broader uses for polyblending - alloying ("Acetals: Familiarity Breeds...", 1977, p. 61).

NEW AND EXPANDED PROCESSES

Reaction Injection Molding is expected to account for 200 million pounds of production by 1985 ("Acetals: Familiarity Breeds...", 1977, p. 36). Solid urethane parts up to six inches thick and weighing seventy pounds can be produced in cycles of less than one minute.

A new injection molding process has been developed at the University of Wisconsin at Madison. This process costs almost three times more than the conventional injection molding machine, but the cycle time is twenty times faster (Rosato, 1977, p. 76).

EMPLOYMENT

Two hundred thousand additional workers are expected to be needed by 1980 (Milby, 1973, p. 5). A recent study by the Society of the Plastics Industry, Inc. has indicated that nearly 75% of the plastics processors responding would pay higher wages for personnel who have pre-employment training in plastics (Steele, 1977, p. vii).

STATISTICS

Since World War II, the industry has grown at a rate double that of all other manufacturing (Curriculum Guide For..., 1977, p. vi). It is estimated by the Society of the Plastics Industry that the volume of plastics used for all purposes by the year 2000 will surpass the production of steel, wood, and all other materials combined (Richardson, 1974, p. 1).

CONSTRUCTION

Construction is the second largest plastics market. At the current rate, plastics will emerge as the major building material of the 21st century. Polyvinyl-Chloride (PVC) is by far the major plastic used in construction: 3.135 billion pounds in 1977 and expected to grow by at least 20% a year through 1985. The potential for future growth of rigid-foam plastics in construction appears to be considerable. For example, a new monolithic prefab 4 by 8 foot panel sandwiches a two-inch polyurethane foam core between a plywood exterior and a ½-inch gypsum wallboard inner face - with wood tongue-and groove joints at the edges ("Plastics in Construction...", 1978, pp. 39-44).

TRANSPORTATION

Most new automobiles use at least 150 pounds of plastics (Steele, 1977, p. 5). It is projected that this will increase to 20% of the total weight by 1990 ("Smaller Cars Ahead...", 1977, p. 9). Graphite composites will replace leaf springs, drive shafts, and bumpers (Miller, 1977, pp. 43-44).

PACKAGING

The milk container of the future will be a package of several layers of polyethylene, paper and aluminum foil. This arrangement keeps milk fresh for three months - without refrigeration (Serchuck, 1978, p. 40). Very shortly, everything from jellies to cheeses and even butter will be purchased in plastic tubes.

AIRCRAFT/SPACE INDUSTRIES

The Satellite Solar Power Station is a composites-processing equipment project currently underway. By 1982, machinery will be designed and fabricated for deployment in low earth orbit. The next step will be full space factories which are scheduled for launch by 1990 to 1995 (Goldsworthy, 1978, p. 25).

MEDICINE

Medical uses include hospital equipment and various replacements for eyes, ears, limbs, and internal organs of the body (Bolick, 1978, p. 77). This increasing use of plastics in prosthetic surgery attests to the absence of allergic reaction to plastics in the human body (Milby, 1973, p. 12).

PLASTICS AND THE ENVIRONMENT

In the United States, nearly 400 million tons of refuse is collected each year. Of this total, only 3% is plastics (Richardson, 1974, p. 139).

CONCLUSION

With all this anticipated growth in the plastics field, we - as teachers of the industrial arts - must prepare our students for their world of the future - their PLASTIC'S world of the future.

FOOTNOTES

1. "Acetals: Familiarity Breeds Respect." Plastics World, December 1977.
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AIAA TH-3:00-7
WORLD OF PLASTICS - FORUM II. Gerald L. Steele, Professor, Department of Industrial Education and Technology, Ball State University, Muncie, Indiana

Plastics equipment is often purchased for new laboratories by people unfamiliar with the plastics program. It is frequently purchased on price alone without regard to suitability of purpose or consideration of objectives. Here are ten criteria for plastics equipment selection.

(1) Suitability for level of Instruction. Equipment should be selected based on the level and type of Instruction and the behavioral goals desired.
(2) Ease of operation. Machines must be constructed so that students can easily operate them.
(3) Sturdiness. Equipment must be able to standup under student use.
(4) Reputation of the Manufacturer. Check with others to find the Manufacturer's reputation.
(5) Service and parts availability. Can parts and service be purchased?
(6) Adaptability. Can molds be changed easily?
(7) Versatility. Can the machine be adapted to more than one process?
(8) Are Instructional Manuals and Teaching Aids included?
(9) Does the machine require more material than is available?
(10) Is the machine safe to operate?

Arnold C. Piersall, Professor, Materials and Processing, University of Wisconsin-Stout, Menomonie, Wisconsin.

A course in industrial plastics can be very interesting and worthwhile to the student. Fifteen years ago such courses at the high school or college level were practically non existent. There are various reasons why students should take a course in industrial plastics. Among them are consumer knowledge and occupational awareness.

Some of the problems encountered in teaching plastics follow.

(1) Why include plastics? Because plastics is a major industry.
(2) How do we get materials and equipment? These are covered in other discussions in this forum.
(3) What to teach first - Materials or Processes? At Stout both are taught at once.
(4) Teaching Materials properties. The extent to which this is done varies with the class.
(5) Care of tooling. This is a problem without clear cut solutions.
(6) Material Storage. A good deal of space is required.
(7) Product Design. This exists where students design and construct mold.

Harlan L. Scherer, Professor and Chairman Industrial Arts Dept., Bemidji State University, Bemidji, Minnesota.

The processing techniques for converting raw plastic materials into finished products can provide an excellent vehicle to introduce manufacturing into your program. It is possible with a minimum amount of equipment and materials to produce a quality product with excellent consumer appeal. The students can gain first-hand experiences with many major aspects of manufacturing.

Soft tooling with silicones, urethanes and epoxies can be used to injection mold plastisol products such as fishing lures.

It is possible to organize this learning unit for a variety of time frames. Less time is involved when molds, materials and packaging are determined by the instructor. The process of injection molding plastisols has been highly motivating to students.

Patrick E. Romero, Asst. Professor, Industrial and Technical Ed. Dept., New Mexico Highlands University, Las Vegas, New Mexico.

A recent study by this author showed that:

(1) Although some plastics programs have existed for nearly a decade little has been done by instructors toward improving their skills or programs by collaborating with industry (industrial experience and assistance).

(2) The absence of coverage of the technical aspects of plastics in programs most likely stems from the lack of advanced academic pursuits at the post-secondary level as well as from failure of most teachers to affiliate with industry at any level.

(3) Programs rated highest had an excellent representation of equipment. More materials should be utilized to reflect the current status of the industry.

AIAA. T-10:45-2

WORLD OF PLASTICS-Forum I. Gary D. Weede, professor, Department of Industrial Technology, Illinois State University, Normal, Illinois; Harry L. Campbell, assistant professor, Department of Industrial Technology, Illinois State University, Normal, Illinois; Terry Richardson, professor, Industrial and Safety Education, Northern State College, Aberdeen, South Dakota; James J. Runnalls, professor, Industrial Teacher Education Department, University of Wisconsin-Stout, Menomonie, Wisconsin; and Phillip S. Waldrop, assistant professor, Division of Industrial Arts, North Texas State University, Denton, Texas.

As it becomes increasingly evident that, as predicted, the volume of plastics produced will equal that of steel by the mid 1980's, the need for plastics programs industrially proportional to the materials (wood and metals) that are being replaced becomes serious. Individual programs as well as Industrial Arts as a whole are subject to criticism for not representing the field of study they profess to portray.

Various factors concern industrial arts educators in getting plastics programs started. A basic decision is whether to initiate the plastics offering as a separate course or integrate it into the existing woods and metals courses. Along with this it has to be determined whether to hire a teacher with plastics education or to educate an existing teacher in plastics. The decision as to whether to offer the very limited crafts oriented instruction or the more comprehensive and industrially representive instruction has to be made. The Forum participants felt that instruction in plastics: (1) should begin at the junior high school level as a unit in an existing course, (2) should be industrial in content rather than crafts, and (3) usually would start with low cost equipment. It was also felt that industrial arts teachers need more education in plastics.

Once the decision to offer plastics instruction has been made the curriculum has to be established. What to teach is dictated by the approach selected and the amount of the budget. Three possible approaches include: (1) introduction to plastics processes; (2) plastics properties and applications; and (3) crafts. The constraints and strengths of each approach vary with the grade level of the students. The advantages of the plastics processing appraoch are: it conveys knowledge of industrial processes, it generates interest in the industrial aspects of plastics, it is inexpensive when compared to the initial costs of machine woodworking and metalworking programs, and it can complement meaningful woods and metals activities. The advantages of the properties and applications approach are: a working knowledge of the properties is developed, it can contribute to consumer knowledge and understanding of design principles, and comparisons can be made with other common materials. The advantages of the crafts approach are: it allows for more creativity, it is adaptable for beginners, and processing equipment is not needed.

Additional factors that influence the curriculum decisions are: limited budget, time distribution between theory and hands-on activities, and level or degree of difficulty of the course content.

Other general considerations in developing plastics programs include (1) inclusion of plastics instruction in industrial materials and processes courses in proportion to its industrial useage, (2) whether to teach plastics materials or processes first or teach them concurrently, (3) how to maintain high student interest and teach meaningful content without restricting activities to take-home "crafts" projects, (4) how should advanced courses differ from introductory courses, and (5) how to maintain plastics labortory equipment. Many decisions will be necessarily influenced by the educational environment that prevails in the individual school in which the courses will be taught.

There are several alternatives to obtaining materials and equipment. For materials these include: (1) buy them if money is available; (2) recycle plastics materials for cost savings and good student activity; and (3) obtain donated materials. For equipment the alternatives include: (1) purchase if there is sufficient money available; (2) design and build it to meet the program needs; (3) sometimes equipment is available through state and federal surplus property control; and (4) work to get it donated.

The first step in obtaining materials and equipment is to determine the plastics program needs. Consideration should be given to: (1) tailor the needs to fit the curriculum; (2) set quantity, size and complexity limitations; and (3) plan beyond the immediate needs and expectations of the program.

Several suggestions for obtaining donations are: (1) establish contacts with persons closely associated with the plastics industry; (2) publicize plastics program offerings and needs; (3) set up an industrial advisory committee for assistance; and (4) be sincere in providing the industry with potential employees and a well informed public. These can well be accomplished by becoming an active member in a local chapter of the Society of Plastics Engineers, Inc. Additional benefits of membership in the SPE include monthly technical publications, formal education opportunities, field trips assistance, and classroom and financial assistance.

A specific subject content topic that was presented in the Forum was that of testing of plastics. There are many standard test procedures that relate to plastics. Since plastics is relatively new as an industrial material many of the standard tests wer already established for metals and woods and it seemed logical to adapt these same tests to plastics. It has since been discovered (sometimes painfully) that tests designed for other materials often do not yeild valid information when they are applied to plastics. Therefore, manufacturers and processors must develop their own testing procedures to approximate service conditions.

Three basic reasons that industrial arts plastics programs should test plastics are: (1) for material identification; (2) to establish and maintain quality standards; and (3) to obtain data for engineering and design purposes. Material identification may include a number of tests including: relative density, hardness, tensile strength, chemical resistance, thermal properties, etc.. Manufacturers, fabricators, and processors must deal with maintaining a quality standard for their product. Students must learn that their evaluation is based upon quality standards and every procedure and product should be carefully evaluated. Processors are keenly aware of engineering and design testing. Their products must past the ultimate test...service! Students should be certain the material and processes selected will meet the design criteria.

PROFESSIONALISM

AIAA. WED./TH. 1:00-2:30 P.M.

WILLIAM EVERETT WARNER: THE MAN AND HIS PROFESSION

David Mohan, Associate Professor, School of Technology
Kent State University, Kent, Ohio.

From 1920 through 1970, the advance of industrial arts was facilitated in part by the contributions and accomplishments of William E. Warner. Born August 22, 1897 to his parents Isaac and Eva Redmon Warner, William was an individual destined to strive for thoroughness and perfection in every task attempted. Personal accomplishments ranged from playing a French horn in the famous "Sousa Marching Band" to his tenure as executive secretary of Epsilon Pi Tau.

Numerous situations and individuals played a major role in shaping the personality of young Warner. Exemplary of these formative experiences were the admiration for his father's accomplishments in education, an admonition by a high school English teacher for shoddy writing skills, and the teacher-student relationships he encountered with V.M. Russell at Platteville, Wisconsin and Fredrick Bonser, David Snedded and John Dewey at Columbia Teachers College. Dr. Warner's numerous publications dealing with the philosophical directions and content of industrial arts mirrored the instructional beliefs he encountered during his doctoral study at Columbia.

While William Warner's published writings exceed 50 plus citations and several other treatises, he assisted in drafting numerous other publications. Documents he helped to draft which have had the most significant impact on industrial arts include:

The Terminological Investigation - Professional and Scientific Terms in Vocational and Practical Arts Education (1933)

The Ohio Prospectus (1934)

Industrial Arts, Its Interpretation in the American Schools (1937)

The Curriculum to Reflect Technology (1953) also titled The New Industrial Arts Curriculum (1947)

In addition to Dr. Warner's extensive publications, he is equally remembered for his contributions regarding the founding of Epsilon Pi Tau (1929), the Ohio Committee (1933), American Industrial Arts Association (1939) and the Ohio Industrial Arts Association (1941). Other activities for which Dr. Warner is recognized are the areas of laboratory planning, equipment selection and curriculum development. His dedication to leadership development through graduate instruction and guidance was also a personal accomplishment of signification impact.

When Dr. Warner's numerous contributions to industrial arts are recalled, his personal loyalty to the advancement of Epsilon Pi Tau emerges as the salient legacy of this past national leader. Since 1979 represents the fiftieth anniversary of Epsilon Pi Tau (1929-1979), it is indeed fitting that Dr. Warner be remembered on this occasion for his personal demeanor and the unique talents shared with a profession he held in high esteem.

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WILLIAM E. WARNER MEMORIAL COLLECTION

Prior to his death, Dr. Warner donated his personal library to Kent State University. This vast holding is now located in the University's Library, Special Collections Department. Cataloging of 900 books and 30 boxes of journals, correspondence and memorabilia is nearing completion. All persons interested in sharing this legacy are invited to Kent State University to utilize the William E. Warner Memorial Collection.

AIAA. W-3:00-3
SUPERVISOR'S RESPONSIBILITY IN ORIENTATION OF NEW TEACHERS TO THE PROFESSION. Robert L. Shearer, associate professor, Industrial Education Department, Miami University, Oxford, Ohio.

The purposes of this presentation is, first, to assist beginning teachers (or teachers new to a school system) in their first months and years in a new teaching environment. This assistance of information and resource materials will undoubtedly help teachers to adjust to their new situations and, therefore, perform more effectively. Secondly, this presentation was developed for the supervisor directly responsible for new teachers, to refresh their ideas and to generate programs to orient new teachers to the profession. Obviously, a negative experience in the first year or two might cause some teachers to leave industrial arts education. With a superior effort on the part of the supervisor, we can minimize this loss and improve the professional levels and effectiveness of beginning teachers.

In defining the supervisor we must include the terms consultant, coordinator, resource person, etc. More specifically, the supervisor may be a department chairperson, principal, director of secondary education or a city or county supervisor. Although the supervisor plays many roles within the job description, we will focus here on the specific duties related to the orientation of new teachers. The final goal of the instructional program is the education of the student. The relationship between teachers and students is where the educational transfer must occur. Since a new teacher may be less effective at that student-teacher relationship than an experienced teacher, it is very important that supervisors have an outstanding orientation program. Supervisory input can be outlined as follows: 1. Supervisory Planning, 2. Summer Orientation, 3. Pre-School Orientation (two or three days prior to start of school), 4. Intervisitations, 5. Extra-Curricular Activities, 6. Individual Conferences, 7. Resource Material Distribution, 8. Community Information. A brief description of each input area follows.

Supervisory Planning for large group, small group and individual meetings is a must to make them productive and worthwhile for each teacher. The key here is personal contact by the supervisor. The new teacher should feel comfortable and knowledgeable about his/her situation. The orientation program should instill a sense of belonging and the new teacher will work hard to be successful at that student-teacher relationship mentioned above. Summer Orientation should be planned to inform a new teacher: a. what needs to be ordered or repaired, b. educational foundations and future directions of the school system, c. exact laboratory and classroom facilities, d. housing and community information, e. next year's budget, f. "buddy" teacher that he/she may call upon, and g. planning assistance for the first few days of school, including definite activities of the subject area and tasks, such as collecting fees, assigning lockers, seating charts, etc. The supervisor should make arrangements to pay the new teachers (one or two days) to accomplish the above tasks. Also, make arrangements to send a local newspaper to the new teacher to assist in extending community news.

With regard to Pre-School Orientation a few days before school begins, this is really a continuation of the summer orientation, therefore, the new teacher becomes more acquainted with the daily schedule, library facilities, counseling services, evaluation and record keeping requirements, etc. Remember, there is only so much a person can absorb so plan meetings to include some open time for teachers to work independently. Follow up with individual conferences or "buddy" teacher arrangements. Intervisitations is a method of supervision to allow new teachers time to visit other teachers and/or professional conferences to broaden their experiences. This is one method of self-evaluation, thus, when the new teacher observes something good, he/she can implement it into his/her program. Also, it is a check of what content is being taught at a particular grade level or within a subject area.

Let's turn our attention to Extra-Curricular Activities such as: sponsoring clubs, coaching athletics, etc. New teachers usually have enough energy to work well at several activities but, I feel two things must be observed. First, the system should not make an extra-curricular duty a mandatory part of the job description and, secondly, new teachers must remember that their prime responsibility is the teaching of classes, therefore, place the time and effort accordingly. Individual Conferences with new teachers should be held periodically to observe progress and to answer questions that new teachers will accumulate. Reports from department chairpersons and principals should be covered at these conferences. An atmosphere of self evaluation should be encouraged so that teachers can identify problem areas and participate in the decision making process to solve such problems.

Resource Materials Distribution is another primary role of the supervisor. As items are received, the supervisor is charged with getting this information to the teachers through personal contacts, in-service meetings, bulletins, etc. This role can be helpful to the new teacher and should be explored to its fullest. In reference to Community Information, the supervisor can be extremely helpful in identifying community/educational relations (industries, social-economic level, etc.); influences of community toward education; and parent/teacher organizational relationships (PTA).

In summary, the new teacher should become familiar with the above outline so that he/she can seek assistance from the supervisor. New teachers should also contact local teacher educators and get involved in professional organizations to grow professionally. The supervisor must remain flexible and strive for better ways to orient new teachers so they quickly become effective faculty members and continue to improve their teaching. Don't treat everyone the same. Try to analyze personalities and plan for a personal development program.

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AIACSA. T-3:00-12

PROFESSIONALISM FOR THE COLLEGE STUDENT. Floyd B. Walgren, associate professor, School of Technology, Kent State University, Kent, Ohio.

Professionalism, as it relates to teaching, is probably one of the most misused, misunderstood, maligned and misquoted word that I can think of. Some typical uses of this word or concept are: Your suit looks nice. He attended all the meetings. She doesn't drink or smoke. He always wears a tie. He comes early and stays late. She never wears pantsuits. She always wears a dress.

Whether one likes it or not, professionalism is a yardstick by which one is evaluated by others as a teacher. If one is going to be evaluated by this, then it would behoove one to clarify his/her understanding of professionalism.

The dictionary defines professionalism as "the conduct, aims, or qualities that characterize or mark a profession." With this in mind, let us look at just what is a profession.

The dictionary defines a profession as "a calling requiring specialized knowledge and often long and intensive academic preparation." But most generally, people think of a "profession" as comprised of such people as doctors and lawyers. Can we include teaching as a true profession?

The American Education Association has and has set several criteria for a profession. These are not an attempt on behalf of educators to place themselves above other occupations, but they are an attempt to clarify the role, direction, and probably most important, the responsibilities of a teacher in our profession.

Originally, the professions arose because people believed that certain services were so important that they should be made available to everyone. Teaching is one of these services. Because of its importance, only a profession has the latitude to monitor or make decisions about its own standards.

Think of the impact these professions have upon society. Yes, I firmly believe that teaching is truly a profession. As a teacher, performing services is sometimes harder than it might be for a doctor or lawyer. As a doctor or lawyer, one receives immediate results most of the time. But as a teacher, one may never know just how much of an impact has been made when he/she performs these services.

It is difficult to be a good teacher. Not only does one not get immediate feedback from his/her students, but they are a captive audience. All children are in classes because they have to be. There is not much recourse if one is not satisfied with a teacher's service. Our democratic process provides an education for each child, but does not give a child the opportunity to "choose" his teacher. Thus, the system does not automatically reward the good teacher and weed out the poor one.

Much of the incentive to be a good teacher has to be self-imposed or self-directed. Because we have not found any one best way to convey knowledge, we must constantly seek to improve our teaching techniques and curriculum. We have had criticism leveled at our profession lately, some of it deserved, and some not.

What steps can one take to overcome these obstacles to becoming a good teacher? How ean one become a professional?

Professionalism is almost entirely self-motivated. It is difficult to monitor or evaluate. You, as a future teacher, need to continue your growth after completion of your formal education in college.

You have just acquired some tools which you will utilize when you begin to teach. You will soon realize that these tools are only a foundation upon which you will start to develop your own professional growth. This growth or evidence of professionalism is your personal search for a better way to convey knowledge. It not only involves belonging to organizations and attending professional meetings, but it also involves participation in these functions, along with learning and applying in the classroom your newly acquired knowledge. It also involves seeking new knowledge in your field through professional journals, industry, more coursework or workshops.

Would you like to go to a doctor who never went back to school or kept up on the latest techniques so that he could better serve you? Your students deserve the latest knowledge and teaching techniques also.

Professionalism is a personal commitment to your growth as a teacher that never ceases.

Earlier, I referred to the fact that many people equate dress, mannerisms, appearances, etc. with professionalism. These are criteria which are easily observed and measured, and may or may not contribute to your success as a teacher. These are some of the criteria with which you might be evaluated. But...never lose sight of the true meaning of professionalism...that you must dedicate yourself to the never ending process of continuous growth which prepares you to enter a true profession--that of teaching.

PUBLIC RELATIONS

AIAA. TH-9:00-10:15

PROMOTING YOUR INDUSTRIAL ARTS PROGRAM. Floyd B. Walgren associate professor, School of Technology, Kent State University, Kent, Ohio.

Before you sell your program, you have to have something good to sell. Have a well defined, functional Industrial Arts program as a prerequisite to venturing out into the world to "sell" or promote your program.

One could start promoting his program within his school, focusing on other teachers. Some strategies might include trading classes with other teachers, team teaching in other areas, and making sure that the entire IA faculty becomes involved in as many affairs and committees as possible.

Appearances are important! Remember that a teacher represents his program. One's appearance should equal or better that of other teachers.

Not only should you present a good image, but areas for which you are responsible should be of the highest standards. Projects are not the only things one might use in a display case. Processes and concepts of industry could also be used.

Within the school, several steps can be taken to attract other students to a program. Establishing an Industrial Arts club can generate much student interest. It can also serve as a service function to other school activities such as drama clubs and school floats for parades. Another idea is organizing or participating in an existing school fair where elements of one's program can be exhibited.

One could initiate some awards to be given to deserving students in IA programs at the annual awards assembly. If needed, a resourceful teacher could even produce these awards.

Be sure to visit other IA programs in your school district, especially schools that might feed into your program. One might attempt coordinating a continuous program between the middle and high schools. If you are teaching in a high school, visits to junior high schools to inform them of program offerings are important.

When venturing outside of the school setting to promote one's program, a good place to start is with the media. Radio stations usually broadcast local affairs. One merely has to inform a station of special events that an IA program or club might be doing. Local television stations might be interested in a special interest story. One must approach these people first, as they will not usually seek you out. Local newspapers will print almost anything, especially if one prepares in advance a small paragraph about some special event. Enclosing a good black and white glossy print with a paragraph is also a good idea.

Working toward a good relationship with local businesses and industries is always advantageous. One of the most obvious ways would be to use them as a resource for field trips. One could set up displays in local business windows pertaining to a program or event. Invite businessmen or leaders from industries to the classroom, to share their knowledge and experiences. Usually they would be flattered to do so, and they might also attempt to find out more about a program if they are going to visit it.

One might attempt setting up an advisory committee composed of several people from local businesses and industries, to make suggestions for improving one's program.

Most industrial arts teachers are known for their ability to "scrounge" materials, supplies, and equipment from local resources. One way to say a special thank you for these supplies would be to photograph these donations and send this photograph (and a paragraph) to a local newspaper.

Securing the services of local service clubs, such as Kiwanis or Junior Chamber of Commerce, is also advisable. These clubs could be the source of several contacts for future business or industrial relationships. They might also provide a source for some of the awards to be given on awards day.

Parents may possibly be one of your greatest assets. Many children do not relate much of what transpires in school to their parents. Attempt to promote opportunities where parents can visit laboratories to become more involved in programs.

Upgrading or just sustaining an Industrial Arts program is very expensive. The administration is usually more receptive to one's needs if one has developed some positive inputs to the administration through the promotion of a program.

When one succeeds in involving other people in an Industrial Arts program, whether within or outside of the school setting, one has developed some positive growth. The success or failure of any program promotion depends on the amount of effort each individual person is willing to produce.

AIAA. W-1:00-4
WE NEED LEADERS--BE ONE! Jerry Streichler, Professor, School of Technology, Bowling Green State University, Bowling Green, Ohio.

The problems which are confronting our society call for inspired leaders in all endeavors -- government, business and, of course, in education. The problems which face our nation are dramatically evident. Energy, inflation, employment of the work force and its productivity are problems which, through the media, impact upon citizens many times each day. Leadership as a world power, a role and responsibility this nation has somehow accepted, is under stress as we walk a tighrope as peace-maker in the Middle East, careful negotiator in accomodating the nations who supply us with lifegiving oil and firm resistor to Soviet expansionism. Undoubtedly, these are endeavors which call for unique talents of government, labor and business leaders.

Because we are a democracy, the successes, failures, foibles and frustrations of our leaders are well known not only to our own citizens but to all in this world who may be interested. The results of this, it seems, is that we are regarded--or our government leaders are regarded--as indecisive, ignorant of other cultures, insensitive and uncapable of accomodating to the entreaties, needs and aspirations of many nations with whom we share the planet. Our business leaders are viewed as promiscuous accumulators of wealth through profiteering in disregard of national needs or, in fact by capitalizing upon sensitive situations which effect our national security rather than compromising their profit motive in deference to the nation's needs. The behavior of labor leaders seems to take on a similar aura--as their motives are not understood but appear not to be in the nation's best interests.

With all this, one may ask as Bennis (1977) does, "Where have all the leaders gone?" It seems that the days are gone of the inspiring leader. It isn't easy to locate one who can identify a problem, reduce it to its fine points and issues--who is able to stimulate approval, acceptance and commitment to a course of action. These things used to be done within a framework of ideals and values which the leader communicated effectively to those whose support was vital. Bennis suggests that really the leaders haven't gone anywhere--they are simply too busy with the barriers, red tape, hurdles, procedures, which have emerged and which are products of our valued free society--to attend to the primary duties and responsibilities of leadership. "They're consulting pleading, trotting, temporizing, putting out fires, either avoiding or taking too much heat--and spending too much energy doing it," Bennis observes, such that those who still accept leadership positions have become an endangered species.

The field of education manifests the same general symptoms. While valued as the funnel through which the individual must flow to achieve success and the good life, the enterprise of education including industrial arts is encumbered by the same things which seem to be afflicting other societal institutions. So leaders in our field are "consulting, pleading..." all those things Bennis thinks wasteful, in response to government regulations on sex and privacy and equal opportunity, and financial stringencies, and declining enrollments, and debates on education for work vs. education about work vs. education to not be about work, and teacher's unions, and academic freedom, and tenure...Industrial arts, in addition to the foregoing, leaders are faced with additional challenges sourced in--relationships to vocational and career education, contending national professional associations, contending philosophical positions on the mission and discipline content and instructional methods of the field, scarcity of teachers, influx of female students, and high costs of delivering instruction in the face of the public's disinterest in taxing itself to support higher educational costs. Unfortunately, education has not been blessed with inspired leaders who seem to be capable or even interested in undertaking the challenges implicit in the foregoing list...and certainly, industrial arts may well have it's pro rata amount of uninspired...or even incompetent leaders. The behavior of educational leaders is woefully characterized when Elam (1979) sarcastically observes "In any case incompetence is in such plentiful supply, that we can be generous with it. There is enough for everybody." He goes on to explain how school administrators, having failed to take strong positions in teacher hiring and retention practices in the past several years, are stuck with a teaching staff which is far less competent than it might have been. The incompetent school leaders, however, shrug off any responsibility in the matter by blaming the situation not on their failure but on their belief that staff dismissal is more difficult today than it was ten years ago. Leaders who behave like this are not leaders...their nerve has failed!

So in local, state and national professional organizations, in public schools, colleges, state and federal departments of education, there continues to be a dire need for leaders with nerve. To insure that industrial arts will continue to make unique but vital contributions to individuals who will serve as self-fulfilled, literate citizens of this nation and the world, the profession needs...and will reward vital, intelligent, far-sighted, inspiring leaders with nerve. Why nerve? For want of a better term, it seems that nerve is what may be needed to overcome the catering, submissive temperament of the many functionaries who seem to rise to positions of responsibility and who then excuse their behavior as in Elam's example on difficulties created by others.

Yes, we need leaders! And if you're game, the rewards and satisfactions will be substantial. To apply your mastery of the relevant disciplines, communication, socio-ecomonics, educational philosophy, psychology of learning, and of management to effectively motivate and move people to greater heights of performance on projects which will improve man's condition is a worthy and rewarding endeavor. For those who have the inclination and the talent potential, preparing to lead and leading may be considered an obligation which cannot be avoided... If you believe you have the qualities of leadership...I hope that you don't avoid the obligation and that you'll be one!!

FOOTNOTES

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PUBLICATIONS

AIAA W-3:00-10:00
WRITING JOURNAL ARTICLES. James J. Buffer, Professor, Industrial Technology, The Ohio State University, Columbus, Ohio and Richard A. Swanson, Professor, Industrial Technology, University of Northern Iowa, Cedar Falls, Iowa.

It is the opinion of the presenters that the research, innovations, and theories produced by the members of our profession far exceed those that are presently making it into print. The purpose of this session was to provide specific information and general guidance to those persons interested in writing journal articles.

The suggestions presented were couched in the experiences that the presenters have had as authors and as members of the Journal of Industrial Teacher Education editorial staff. Many of the suggestions centered on the content, writing, and submission of articles.

In terms of content, editors frequently receive manuscripts that are unsuited to the journal goals and readership. Authors should review past issues of several potential journals to determine which journal is most appropriate to their topic. The editorial policies of each journal should also be reviewed.

Beyond the concern for selecting the appropriate journal, there are fatal flaws that can occur much earlier in the process. Two of these flaws are in the realms of significance of the problem and the design or procedure. Obviously, these flaws need to be avoided in the conceptualization of the study and not on the dissemination end. To pursue a lengthy study without external criticism as to its significance and design can result in a rejected article long after the study has been completed.

In the area of writing, three bits of advice were noted. The first is to become thoroughly familiar with the Publication Manual of the American Psychological Association (1972). Following this manual will improve both the writing style and mechanics of the article. It's an invaluable aid.

Outlining is a necessity for most writers. Organizing ideas and the flow of ideas into a second or third order outline keeps the author focused on the objective of the article. Professional peer criticism during the writing stage is the third suggestion for improving the manuscript writing. Acceptance of a several draft writing process and the need for objective in-process peer review slows down the writing production, but, will surely increase the quality.

Submission of articles may at first appear to be the easiest step. But, it is at this point that the author loses control over the manuscript, is at the mercy of the editors, and is placed on the defensive. Knowing that very few articles are accepted outright should help the author. But, rejection hurts even the most experienced authors. Listed below are the range of responses that authors receive from the Journal of Industrial Teacher Education editors:

1. On rare occasions an article will be accepted as is.
2. At times the author will be requested to make specific minor revisions and resubmit the manuscript (which the author does, and receives an acceptance letter.)
3. Most often the author is asked to make major revisions. Feedback and recommendations from assistant editors are enclosed to help the author (An author receiving such information from the editor should accept this information as encouragement to revise the manuscript. Unfortunately, some authors become discouraged because "they have been rejected").

4. Sometimes an author is notified that the manuscript is worthy of publication, but is more suitable for another journal. Specific journals are suggested.
5. On occasion an author could be told that the manuscript is simply not publishable. Reasons for this decision and suggestions that would be helpful are given to the author (Bradley, 1979).

In conclusion, writing journal articles is not easy. The truth of the matter is that even the most prolific writers in our profession agonize over the process. It is hard work and should be considered none the less.

References

Bradley, C. H. Getting published in the journal of industrial teacher education. Unpublished manuscript, 1979. (Available from C. H. Bradley, Industrial Education Department, Florida International University, Miami, Florida.

Publication manual of the american psychological association - second edition. American Psychological association, 1974.

AIAA. W-3:00-4:30

NEWSLETTER FORMAT. Merle A. Denning, retired from drafting and Visual Communication Education, Tucson High School, Tucson School District, Tucson, Arizona.

Establishing necessary materials and articles conducive to the interest of Industrial Arts teachers, through the medium of a printed NEWSLETTER. This will be somewhat of a workshop type of presentation, as had been requested by some at the Atlanta Conference.

First, we must be sure that the State Associations want, or have committed themselves to, the production of a NEWSLETTER. An IRS and incorporation form are a must before securing the non-profit organization mailing permit.

Secondly, has printed, or insured that the membership is congenial and cooperative in promoting some kind of printed form.

Editorship: Some state associations change editors periodically, some retained for a long time because of years of service and experience, while others are selected by their capability in handling the management of contracts, in the art and design of the production, and general knowledge of page content and layout. Retired personnel, who have had experience in art work and the general facets of photography, along with off-set printing, are the most qualified to be an editor. The responsibilities of the editor could fall under classifications such as full management and avisory board. Full management would give the editor full reign in decisions covering the many facets of the publications. An editor working under the supervision of a state association advisory board may find his effectiveness impeded. Also, the Fall issue is always used as the media to instill in the I.A. teachers the importance of being a member of the local, state and national associations.

Articles: From whom? State or National? A definite length as to number of words or column inches of printed material. It is best to have articles typed double-spaced for the phototypesetter. Pictures should be black and white, gloss finish. Individual, or group pictures, should be very sharp for off-set printing. If collages are used -- spliced (no break) or banded with separator strips. It is logical to have articles on pages that relate to specific advertisements, if at all possible.

Page Content: This can vary as to what is to be conveyed to the reader in the form of articles and picture. Articles of interest to the Industrial Arts profession come from various noted persons. It is very important that lines or pictures are set either vertically or horizontally with the page, unless there is a special way to act as an eye-catcher, or to prove a point of interest.

Set-Up As To Pages: This depends on the amount of contract advertising and material submitted. The cover is the main page and is generally designed to carry a THEME along with related material. Color (or colors) play an important part on the cover to make an impact on the reader. As for the cover - planning for it in advance, in relationship to such as membership, etc., and the proper timing. Color for variety and emphasis: Blue has a calming or tranquilizing effect and is used to designate coolness. It also suggests honesty and sincerity. Red, on the otherhand, suggests heat, intense activity and excitement. It also has a high attention-getting value. Green suggests freshness and coolness. Brown is associated with strength, age and utility, and purple with royalty and stateliness. Color can be used simply for identification, to come to the source of coded messages, or to the recipient. Colored paper, or colored ink combination, gives direct emphasis to important information.

Mailing: This can be a big problem for the association or the editor. Most nonprofit organizations use the 3rd class mailing permit, which requires 200, or more, be mailed. Who is to receive the publication is always a big question. Mailing in some states is done by the listing in the state directory. The larger the mailing is to the Industrial Arts teachers, coordinators and supervisors, the better the attitude the advertisers have toward the publication.

Advertisements: Income from the advertisers' contracts covers the cost of the printing, editor, office expenses and special items for the production of the publication. Mailing permit and cost of mailing is generally handled by the association, since it is incorporated. Square inches of advertisements leaves approximately 40% for the body of the issue. Advertisers should be instructed that advertisement be camera-ready, in black and white, to fit in the allotted space, or special set-ups are done in helping in preparing or redesigning the copy.

Cost of Publication: The cost of printing a NEWSLETTER varies as to the method used. The cost will vary as to locale and the number of copies. The advertising rate, per issue, must be set up in such form that companies can see that the rates are giving them a good coverage throughout the Industrial Arts field. Also, contracts and introductory form letters should be mailed to continuing and prospective advertisers during the months of June or July, giving them sufficient time to work it into their budget for next school year.

Policy: This is a very important item in the publication of a NEWSLETTER. It must be understood that all accepted articles, etc., submitted are subjected to either editorial changes (within reason), or condensed to fit a particular space. If there should be any question in the using of a student picture in any of the publications, have the parents sign a permission slip to do so.

Timing Of Issues: Fall - membership (local, state and national materials from AIAA). Winter - budget, requisitions for materials and equipment, replacements, conferences or conventions. Spring - travel, summer school courses, next year's requisitions and conferences.

I trust that I have aroused your interest to the point that you have questions to be answered by someone who has been able to handle the situation or who can give you a logical answer.

AIAA. TH-3:00-4:30
WRITING TEXTBOOKS. Stephen R. Matt, assistant professor, University of Georgia, Athens, Georgia.

The information given here contains suggestions on how to get started in writing. I used many of them to help me in writing my Electricity and Basic Electronics text for The Goodheart-Willcox Company, Inc.

A. Find A Publishers
   1. Ask friends, acquaintances, venders at display booths.
   2. Read publishers' advertising literature asking for authors.
   3. Ask state and national associations if they need writers.
   4. Write company sponsored material.
   5. Start writing for your school/School Shop/MST.
   6. Ask for jobs where you proofread material already written (AAVIM-House Wiring): Led to writing slide tape scripts.
   7. Ask other authors for help getting started.
   8. Contact producers of slide tape sets.
   9. Act as judge for shows, festivals, and other gatherings where expertise can be shown and at the same time you gain visibility.
   10. Get known by attending meetings such as this one.
   11. Write to publishers; submit resume and state previous writing experience; submit outline or table of contents.
   12. Once contacted, agree on expenses, royalties, time considerations, preparation, and then sign contract.

B. Determine Format
   1. Although you may wish to write on a topic using your own style and format; the publisher will, to some degree, dictate style, layout, reading level, etc.

C. Collect Information
   1. Visit library and gather information, such as, books by other authors, manufacturers of equipment in area on which you are writing, component manufacturers, and other suppliers.
   2. Write letters requesting catalogs, literature, or brochures - State you are writing and name the publisher.
   3. Review brochures and look for photographs with potential value for text inclusion.
   4. Write letters requesting 8 x 10" glossy photographs, permission to publish, and state that credit will be given for material used. Identify photos received; do not write on photos with ball point. Cover them with tracing paper attached on rear with drafting tape.

D. Write draft of at least one chapter and review it with your publisher.
   1. Saves later rewriting and stabilizes form and format. Keep one copy in a second safe location in case of fire, flood, or other unforseen problems.
   2. After approval is obtained continue writing, "work in" photographs and material obtained earlier. Avoid photos which "date" the text i.e. cars, buses, air-planes, neckties, collars, haircuts, and dress styles.
   3. Ask someone with similar background to review material. This will help you check out the technical aspects and insure clarity. Payment or credit normally required for those assisting.
   4. Submit finished manuscript; keep one copy for later discussion and revisions.
   5. Supply filler photos for dead space at the end of a chapter. This also leaves space for later revisions.

E. Work with publisher and their editorial staff.
   1. Proofread the galleys if possible.
   2. Check all artwork, photographs, illustrations, and camera ready layout sheets.
   3. Proof all material as though you were one of the readers and keep asking yourself "why?" to be sure that material is clear and easily understood. Corrections at this point are least costly and save greatest amount of time and sometimes some embarrassment.
   4. Go over the silver prints as quickly and accurately as possible.
   5. Return silver prints to publisher with corrections noted.

F. Check finished book
   1. Look for errors

G. Start writing the first revision.

H. Collect and cash your royalty checks.

ACIASAO W-1:00-3
NEWSLETTER ROUND TABLE. Dr. Norman C. Pendered, Director of Graduate Studies, School of Technology, East Carolina University, Greenville, North Carolina.

First, I'd like to present the overall picture of state association newsletters based on a recent national survey I made. The data were gathered about a month ago and consisted of an inquiry to all known editors (38) with a reply of 79%. Then, I'd like to discuss briefly the following: (1) titles of publications, (2) titles of editors, (3) format, (4) ideas for generating news, and (5) conclude with some general suggestions for editors.

The National Picture:

From a national point of view, the two biggest problems in state association publications are (1) not all state associations have publications and (2) the turn-over in editors is high.

Thirteen states or 26% do not have newsletters editors. Conversely, 74% of the states do have newsletters and editors. There are no newsletters in Guam, Virgin Islands, or Puerto Rico. At least three provinces in Canada have newsletters: New Brunswick, British Columbia, and Ontario.

Some states, e.g., Iowa and Rhode Island, have a publication, butit is not published by a state organization; the State Department of Education publishes it. The same may be true for South Dakota.

In Montana, Agriculture and Industrial Education combine forces to publish a state newsletter.

Tennessee is the only state where the American Industrial Arts Council of Student Associations at East Tennessee State University puts out the state association newsletter.

1. Titles of Publications:

Most state association publications are called News or Newsletter. Some publications use the title, Bulletin. Pennsylvania is going to change their name to Journal. Some states prefer distinctive titles like, Disseminator (South Dakota); View (British Columbia, Canada); Initiative (New Brunswick, Canada); The Spokesman (New York) and Relay (Oregon). South Dakota plans to redesign their format and call their publication, Spark Plug.

2. Titles of Editors:

Sometimes it is difficult to find the editor's name in the publication; some editors do not include their name at all.

Titles vary among editors, e.g., editor, copy editor, editor-in-chief, and managing editor. It depends on what you do. If you do copy editing, then you are a copy editor. If you have a staff including associate and/or assistant editors, news editors, feature editors, et al, then truly you are an editor-in-chief. But, from a professional viewpoint, the "top dog" - the real boss, is the Managing Editor.

3. Format for a State Association Publication:

The format for a publication is dependent upon several variables including (a) finances, (b) advertisements, and (c) news availability.

(a) Finances - Who's going to pay the bill? Will the state association pay all or part of the printing cost or will the publication be self-sustaining?

(b) Advertisements - Not difficult to secure, but you should have an advertising manager. Establish standard sizes for horizontal and vertical formats and determine rates. Most companies will send you either camera-ready copy or negatives for their advertisements. Camera-ready copy is more flexible because you can adjust the negative size when you shoot it. Negatives are easier to use because you simply strip them into the "flats."

(c) News availability - Keep in mind that you cannot gather news and edit it as well as publish or print it alone. You need a staff - an organization. There are good reasons for this: you need help; do not let the state association feel it is "your paper;" the more members you involve, the more the membership feels it is "our publication."

4. Seven Ideas for Generating News Items:

(a) Have a guest editorial for each issue. Select well-known people. Set up a schedule, don't live from issue to issue. Set due dates; give the person plenty of lead time. Set a word limit. Ask the guest editor for a photo and some biographical information.

(b) Have regular feature columns, e.g. "From the State Office" (of your state consultant), "Safety in the Lab," "Women in the Field," and "With the Researchers." Select someone you can depend upon to prepare a feature article for each issue. Give the person by-line credit and even a logo for the column.

(c) Appoint staff writers throughout your state for city, county, district, or regions depending on how your association is organized.

(d) Appoint campus reporters from each teacher education institution in your state.

(e) Appoint a staff photographer to send in photos regularly and especially at annual state meetings.

(f) Appoint an editorial assistant to gather filler material consisting of 3-5-8 lines of pertinent information to fill out a page. Have these ready at make-up time.

(g) Use news from AIAA publications and other state newsletters. It is desirable to ask permission to reprint and always give credit.

5. Some General Suggestions:

(a) Get a bulk mailing permit if you don't have one. Be sure to include the zip code on it, if you are using an old permit. Check on new postal regulations. There are some changes coming up in the near future which will affect bulk mailing.

(b) Use self-adhesive Tabulabels for addressing newsletters. Use either (1) computer-produced labels from IBM cards or buy Tabulabels in sheets and reproduce a "run" by Xerox. Save original copy to make corrections and to reproduce other "runs."

(c) Keep mailing addresses up-to-date. Avoid cost of "return postage guaranteed;" instead, use "address correction requested" which costs 25¢.

(d) Include in each issue a schedule of deadline dates for future issues.

(e) Send other news editors your publication and ask to be placed on their mailing list. Write AIAA office for current list of editors.

(f) Send a copy of your publication to Marilyn Sharkey, Editor, Man, Society and Technology - be sure to send every issue.

(g) Think about what South Dakota is doing in their publication: "This issue has been reviewed for racism and sexism content."

(h) Include in your newsletter this statement: "This material is not copyrighted. If there is any good here, we want to share it."

(i) In each issue print an address-change reminder. You can put a special form in one corner to be filled out and mailed to you.

RESEARCH

AIAA. TH-3:00-6

READING IN TECHNICAL AREAS. William D. Paige, Assistant Professor, Department of Industrial Education, Iowa State University, Ames, Iowa.

This research endeavor attempted to provide some evidence relating to the questions: Can reading comprehension be increased by lowering the level of readability of a textbook? Does providing a glossary of technical terms at the beginning of a reading selection aid in increasing the level of reading comprehension? More specifically, the purposes of this research were to: (1) determine the effects of lowering the level of readability of textbook materials on the level of comprehension and (2) to determine the effects of providing a glossary of technical terms on the level of comprehension.

To accomplish these purposes, two readings were selected from Chapter 17 of Electricity and Electronics by Howard Gerrish. The level of readability for these passages was estimated by using the Fry Readability Graph and the Flesch Reading Ease Formula. These readings were then rewritten at approximately an 8th grade level of readability.

Fifty item cloze tests were constructed using the two original readings and the two rewritten readings. Half of the original and half of the rewritten cloze tests were provided glossaries of technical terms at the beginning of the reading. The four cloze tests--(1) rewritten with glossary, (2) rewritten without glossary, (3) unaltered with glossary, and (4) unaltered without glossary -- were then randomly assigned to the subjects within intact first year electricity classes. These 10th, 11th, and 12th grade classes were from two high schools in a northern Florida county.

The cloze tests of the first of the selected readings were administered to a total of 108 subjects on the first day of the study. The cloze tests of the second of the two selected readings were administered to 105 subjects on the second day of the study. The data resulting from these cloze tests were subjected to a multiple regression analysis.

The findings of the study led to the conclusion that lowering the level of readability substantially increases the level of comprehension. It was also concluded that the presence of a glossary of technical terms at the beginning of the reading did not help increase the level of comprehension.

AIAA. T - 1:00 - 2:30
COMMUNICATION TECHNOLOGY COMPETENCY TASKS. John M. Ritz, Assistant Professor, Department of Vocational and Industrial Arts Education, Old Dominion University, Norfolk, Virginia.

During the summer of 1977, the Virginia Industrial Arts Education Service introduced The Industrial Arts Curriculum K-12, A Model for State and Local Planning. This model was developed to serve as a basis of all public school industrial arts programs in Virginia. The plan outlined the preferred courses, course sequences, and purposes which should be addressed in public school industrial arts program.

With the introduction of this model plan, a new requirement was given to the industrial arts teacher preparation institutions of Virginia. This requirement was to train graduates in the knowledge, skills, and attitudes needed to implement many of the new recommended courses listed in the model plan. Examples of these new courses included Exploring Technology, Material Processing Technology, Communication Technology, and others. Until recent years many of the state teacher education institutions based their curricula on the material areas of industrial arts. With state and national changes, teacher education institutions began moving their curricula toward a conceptual approach of the areas of production, transportation, and communication.

The problem of this study was to identify and validate communication technology competencies needed by industrial arts teachers in Virginia. Communication technology was defined as that conceptual industrial arts area which dealt with the technical and social/cultural processes involved in the transmission of information from a source to a destination.

To answer this problem, the following objectives were used as guides.

1. Review the literature to identify appropriate communication technology competencies needed by graduates of industrial arts teacher education institutions in Virginia.
2. Prepare a list of communication technology competency tasks for industrial arts teacher education.
3. Validate the list of identified communication technology competency tasks by survey to the members of the Virginia Industrial Arts Teacher Education Council.
4. Prepare and publish a catalog of competency tasks for communication technology.

From the literature review of texts and journals focusing upon the areas of communication technology, 77 initial tasks were identified which related to teacher education in communication technology. The base which was utilized to orient this search was the Virginia Curriculum Guide for Communication Technology. This was a state adopted senior high school industrial arts course. These task statements were then organized and structured into a three response instrument.

During the month of May 1978 the instrument was mailed with a letter of introduction and stamped return envelope to the 24 members of the Virginia Industrial Arts Teacher Education Council. They were asked to respond to each of the 77 tasks by either indicating agreement, uncertainty, or disagreement. This procedure was used to validate whether the tasks should be made part of the industrial arts teacher education curriculum for the four teacher preparation institutions of Virginia. Procedures were also made for the population to suggest other competency tasks needed of undergraduate teachers.

Through this investigation, 78 communication tasks were identified and validated. An 88 percent response was obtained through a mail survey to members of the state teacher education council. All but five of the initial tasks listed on the survey instrument received a 70 percent or higher agreement for inclusion in the communication technology curriculum.

In addition to the validation of the competency tasks, a number of teacher educators raised the question if the competency tasks dealing with electricity/electronics should be included in the communication or power and transportation curriculum. They agreed that the content was viable for the overall industrial arts program but questioned which area was responsible for its instruction. This is a matter which will receive additional discussion as the Industrial Arts Teacher Education Council finalizes their competency task identification and validation. However, the evidence reported from this research shows that there exists a significant number of tasks which should be incorporated in teacher education programs in communication. This includes knowledge in the broad general area of communications. Although the content for industrial arts teacher preparation programs has been in a state of flux for the past decade, tasks have been identified and validated for communication technology. The work that remains is to develop curriculum that will reflect this content.

AIAA. T-3:00-20

SURVEY OF GUIDES FOR INDUSTRIAL EDUCATION IN THE UNITED STATES AND CANADA.

Henry J. Sredl, Chairperson, Industrial Education Division, University of Illinois, Urbana, Illinois. J. Steven Everett, Manager, State Guide project, University of Illinois, Urbana, Illinois.

The development of a comprehensive planning guide for the improvement of industrial education was funded in the summer of 1978 by the Illinois Department of Adult, Vocational and Technical Education (DAVTE). This activity, officially titled "Illinois State Guide for Industrial Education, K-Adult," was identified as a high priority need by the Illinois Joint Industrial Staff, a state level group consisting of representatives from DAVTE and every Illinois college and university engaged in industrial education. The University of Illinois received the prime contract and its staff is working with Illinois State University and Northern Illinois University representatives as sub-contractors. The first phase of this project involved surveying the fifty states, twenty-one major U.S. cities, and the provinces of Canada to determine the existence and essence of industrial education planning guides on the state and city level. This report is a summary of that survey.

Survey Design. A one page survey instrument was designed to: 1) determine the existence of industrial education guides currently in use; 2) describe the development of industrial education guides; and 3) gather information leading to a common definition of industrial education. Two notes are of importance here. First, industrial education was purposely not defined in this instrument. It was felt that stating a definition would provide controversy, thus limiting the primary purpose of the survey. The issue of definition will be addressed in the analysis of the survey results and guide materials. Second, the word planning was deliberately omitted. While the survey was interested in determining the extent of planning guides, it was felt that omitting the word planning would allow the respondent to send whatever guides or models the city/state had.

The survey instrument had six items: 1. Does your state presently have a guide and/or model for Industrial Education? 2. Does your state presently have material which is similar to a state guide and/or model for industrial education? 3. If you answered yes to either of the above questions, please provide the bibliographical reference and the source for obtaining the material. 4. Publication often lags research by several years. Are there persons in your state currently involved in Industrial Education planning who you believe should be contacted for more recent information? 5. If you answered yes to question 4, please provide the person's name, address and phone number. 6. Please write below any comments you may have relevant to the subject of this study.

The instrument was sent to the individual in each city, state and province who appeared to be the equivalent of the director of industrial education. Several states did not have such a person but did have directors or the equivalent for such related areas as industrial arts education, industrial technical education, vocational education and trade and industrial education. In such cities, states, and provinces, duplicate questionnaires were sent to those responsible for these areas. As a result, 103 surveys were sent: seventy-one to the fifty states; twenty-one to the cities, and eleven to the provinces.

Survey Results. Eighty-three of the 103 surveys were returned for a response rate of 81%. All fifty states responded to the survey. Figure I is a tabulation of responses to the first item.

Figure I

RESPONSE TO SURVEY ITEM NUMBER ONE

	United States		Canada
	States	Cities	Provinces
Yes	27	6	2
No	34	4	2
No comment	5	2	1
Not Returned	5	9	6

Item number 2 revealed no new information. Item 3 identified 60 titles of which 37 were considered for review. Figure II catergorizes the titles considered for review.

Figure II

GUIDES CATERGORIZED ACCORDING TO AREA AND TYPES

Areas	Types	
	Curriculum Guides	Planning Guides
Industrial Education	2	3
Industrial Arts Education	4	6
Trade and Industrial Education	1	2
Vocational Education	7	3
Technical Education	4	0
Standards	2	2
Industrial Training	1	0

Items 4 and 5 identified 20 individuals to be contacted for information on developing programs. Item 6 provided forty comments from which 10 additional sources of information on guides under development were identified. Thus items 4, 5, and 6 combined to provide 30 additional sources which are currently being investigated.

Discussion. A complete study of the results is presently underway. Preliminary analysis reveals a number of important issues: 1) there is a wide discrepancy between what cities, states and provinces identify as guides; 2) confusion appears to exist about planning guides as opposed to curriculum guides; 3) the area of terminology is in need of research and refinement.

This presentation is the first of several which will report, discuss and debate the issues related to industrial education.

AIAA. TH-9:00-21

ATTITUDES TOWARD INNOVATIVE INDUSTRIAL ARTS PROGRAMS.

John S. Vaglia, assistant professor, Department of Industrial Education, East Tennessee State University, Johnson City, Tennessee.

During the past two decades, industrial arts has made considerable strides in the area of curricular development. Contemporary and innovative programs have generated wide interest. Based upon the interest and publicity given the new programs, one might expect that they have replaced the traditional industrial arts programs. Research has shown this to be a false assumption.

The successful adoption of new programs depends largely on the classroom teacher. Research indicates teachers play a major role in the promotion or hindrance of program change. Since the teacher holds such a prominent position in the process of change, the development of positive or negative attitudes toward innovative programs may be influential in their success or failure. Thus a study of industrial arts teachers' attitudes regarding the adoption of contemporary and innovative curricular programs could add new and meaningful knowledge that could facilitate further curriculum development and change.

The major problem of this research was to determine middle Appalachia industrial arts teachers' attitudes and their perceived willingness to adopt contemporary or innovative industrial arts programs. A secondary problem was to investigate the relationship between the industrial arts teachers' attitudes and the following factors: (1) age of teacher, (2) educational level attained, (3) years of teaching experience, (4) grade level taught, (5) regional location of college attended, (6) industrial work experience, (7) familiarity with contemporary or innovative curricular programs, and (8) workshops attended or college courses taken dealing with contemporary or innovative industrial arts programs. The purpose of the study was to provide information on attitudes of industrial arts teachers in middle Appalachia that would be of value in the development of better in-service programs and workshops to strengthen the willingness to adopt contemporary and innovative programs in industrial arts.

Middle Appalachia consists of four counties in southeastern Kentucky, ten mountain counties in western North Carolina, twenty-eight counties in East Tennessee, twelve counties in southwestern Virginia, and three southern counties in West Virginia. The entire population of secondary middle Appalachia industrial arts teachers (248) were asked to participate in the study. A survey instrument, employing Likert-type scales, was developed to assess the attitudes of industrial arts teachers regarding participation in innovative programs. The survey opinionnaire contained the following four parts: (1) In-Service Participation Checklist, (2) Short-Form Dogmatism Scale, (3) Change Factor Index, and (4) personal background data. Data were collected by mail; 68 percent of the industrial arts teachers returned the completed survey instrument.

A correlation matrix was produced by computer to compare possible relationships between the three major criterion variables and the eight personal background factors. The Pearson product-moment correlation coefficient was employed as the basic statistical procedure. Other statistical techniques utilized in the study were biserial correlation and the point biserial correlation. Six null hypotheses were tested at the .01 level of significance for a two-tailed test. Two of the hypotheses were rejected.

Data analyses revealed a significant negative relationship between an individual's willingness to participate in in-service activities and his assessment of the factors which could affect program change in his school situation. No statistically significant correlations were found between criterion variables of in-service participation and dogmatism, or dogmatism and change factors. Significant relationships were found between in-service participation and the following personal background factors: industrial work experience (positive); familiarity with contemporary or innovative programs (negative); and workshops attended or courses taken dealing with contemporary or innovative industrial arts programs (negative).

The following observations were derived from the findings of the study:

1. Curriculum material and information concerning change was readily available to middle Appalachia industrial arts teachers.
2. Middle Appalachia industrial arts teacher's attitudes associated with dogmatism and change factors play an important role in the acceptance or rejection of new curricular practices and programs.
3. Industrial arts teachers with two or less years of teaching experience tend to exhibit a reluctance to participate in activities presenting contemporary programs or practices.
4. Industrial work experience of teachers is a positive factor to be considered when presenting contemporary programs or practices to industrial arts personnel.
5. A variety of in-service activities are being carried out by a large group of middle Appalachia industrial arts teachers.
6. Industrial arts teachers in the rural areas of middle Appalachia tend to have higher scores on the Dogmatism Scale (less open-minded) than the teachers from the urban areas of the region.

The process of implementing program or curriculum improvements and/or change is much more complex and involved than the appointment of committees and the development of curriculum materials and guides. Changes in the curriculum or program involve behavioral changes in people. Teachers who are involved in changes are also involved with the changing of their beliefs, attitudes and feelings.

Research findings of this study have provided some tentative guidelines to change agents and curriculum specialists regarding certain factors affecting change. It remains for future researchers to pursue more extensively those characteristics and attitudes which promote or impede curricular change.

AIAA. W:1:00-6
ENERGY RESEARCH: HOW TO GET STARTED. James N. Yadon, Associate Professor, Division of Engineering Technology, Memphis State University, Memphis, Tennessee.

Energy Research is a natural result of a good energy program in the industrial arts laboratory. The questions generated by both the students and also the equipment and devices provide a wonderful opportunity to participate in applied research. Applied research is defined as seeking answers to problems.

Questions provide opportunity to formulate assumptions regarding the generation, conversion and use of energy and energy devices. The first question most often is "How does it work?" followed by the logical question "What principle lies behind the operation?" When these two questions are answered the next most logical question in "Can it be made to work better or more efficient?" This last question can almost be answered with a positive response.

An assumption is then easy to accept: Almost anything can be made more efficient. This is energy research at the simplest level. Based on the assumption that anything can be improved in its efficiency, the next step is to state the problem in most easily understandable terms. "Why is the device inefficient?" Then review the possible causes of energy loss. Friction is the most common problem in most devices and much energy research can be applied to the simple problem of reducing friction. A second problem very closely related to friction is the problem of thermal energy transfer. This problem offers a great many opportunities to research the possibilities for either retarding or advancing the rate of thermal energy transfer as the case may be.

Appropriate technology is one area that has provided the individual teacher with a great opportunity to become involved. The Department of Energy is seeking to have more individual input into the solution to the pressing energy problems by providing grants to individuals, institutions, and small bussinesses. The grants are limited in funding to assure that one group cannot receive more than $50,000 in any two year period. This provides for larger numbers of people to become involved in the search for energy solutions.

The wide variety of projects which have been funded indicates an openess to try new and novel solutions to problems spanning a great number of areas which are currently under investigation as possible energy saving or conserving devices or processes.

The following projects were funded in the Pilot Regional Program in the Spring of 1978, Holbrook High School, Holbrook, Arizona. The school will construct pre-fab modular classroom equipped with solar heating.

Window Rock School District #8, Fort Defiance, Arizona. "Project Saw" (Solar Adobe Wind) plans to build a model home modifying the Navajo hogan and incorporating solar energy technology. Fluid Energy Systems, Inc., Santa Monica, California, "Aqua-Power Borge" a scale model of a free system of turbines, generators and electrical equipment using any moving body of water to produce energy.

Fredrick Wingard, Oakland, California, to develop secondary-level teaching materials for instruction in energy concepts.

The question each of us needs to ask ourselves is "What can I do to get started in energy research?" The answer may be as near as your next class, your next automobile trip home (do you know how much difference in gas mileage 2 pounds of air pressure in your tires makes?), the fan blade on your air conditioner or air cooler (did you ever think of making a simple testing device to determine the air movement distance or velocity of a fan)? Note: A dirty fan blade will not move air as far as a clean one, or any one of a thousand things which all too often go unnoticed until someone takes a careful look and ask the question "How can I make this thing work better."

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SAFETY

AIAA. W-1:00-17

OSHA IN WOODWORKING LABORATORIES. Clyde "Jack" James, Jr., assistant professor, Industrial Technology Department, Illinois State University, Normal, Illinois.

As industrial educators in woodworking are simulating industrial processes and practices, there must be a concerted effort to include OSHA regulations as an integral part of a comprehensive program. Since the woodworking industry must follow federal regulations, there is a potential for school lawsuits if these guidelines are not followed. The following topics should be viewed in an effort to comply:

1. life safety code
2. personal safety
3. chemical agents
4. fire hazards
5. machine guarding
6. shop layout
7. noise control

All laboratories must have at least two means of egress (remote from one another) that will provide all persons an adequate means of escape without passing by a high flammability area. These exits must be measured in exit capacity units (22 inches is one unit) to calculate the size and number of units needed for adequate egress.

All students must wear an approved pair of industrial safety glasses. These glasses will have an insignia located at the top, center of each lens. (Example: AC representing American Optical) Students wearing perscription glasses should have the insignia located in the outer, top corner of each lens. If this insignia is not present, the student must wear a pair of splash goggles that meet ANSI Z87.1 standards. All safety glasses should have side shield protectors. Other face protection can be worn for special operations in addition to safety glasses.

During any operation creating fine dust, mists, or vapors, the student should be provided a suitable respirator. Respirators with interchangeable cartridges are the best as they are suitable in many situations.

Many finishes and solvents used are fire hazards as well as health hazards. Storage cabinets designed for flammables should be used and each container should be analyzed for specific content. After analyzing storage cabinet contents, a fire diamond should be displayed to warn fire fighters of various hazards.

Each machine should have its point of operation guarded. Also, any belts, pulleys, chains, wheels, etc. that can catch, cut, or pinch should be guarded. All on/off switches on like machines should be located in approximately the same place and operate in the same manner. The layout of various machines should reflect operational sequence as well as safe locations for operators and helpers.

Noise control should be evaluated on an individual machine basis. One or two machines may be causing the entire noise problem. By determining which machines create the problem and working on these machines first, the financial outlay can be greatly reduced and the problem solved.

When a commitment is made for compliance, a prioritized system should be developed to afford a school district and instructor the maximum legal protection possible. A program to provide instruction and safety equipment for students and instructor is the most valuable commitment and can be accomplished very readily. Life safety code requirements and shop layout considerations should be evaluated next as they will require school board approval and possibly large financial outlays. Third, chemical agents and existing fire hazards can be evaluated by the state fire marshal. The last consideration should be machine guarding and noise control. The problems created by machine guarding and noise control are being addressed by most machine manufacturers and; therefore, by contacting individual company representatives, valuable information can be received relating to the elimination of these problems.

Complying with OSHA regulations in the woodworking laboratory is an involved process. Because of the many facets of the regulations, outside consultants can provide valuable information for the laboratory instructor and/or school district that is trying to comply with the regulations.

SPECIAL NEEDS PROGRAMS

AIAA, Th-9:00-10:15.

EQUIPMENT AND FACILITY CONSIDERATIONS FOR THE HANDICAPPED.

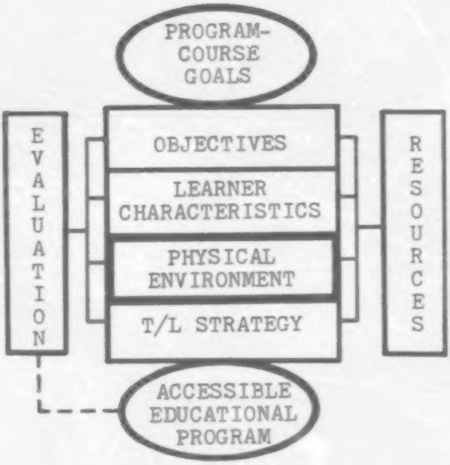
Ray Shackelford, Assistant Professor, and Richard Barella, Associate Professor, Department of Industrial Education and Technology, Ball State University, Muncie, Indiana.

New laws mandate as never before in the history of the United States, equality of educational opportunity for that large segment of the school population classified as handicapped. Two laws which will have a great impact on industrial education are the Education for all Handicapped Children Act of 1975 (P.L. 94-142) and certain sections of the Rehabilitation Act of 1973 (P.L. 93-112). These laws which complement each other require that all handicapped students have equal access to the programs and services available to the non-handicapped. The meaning of P.L. 94-142 and Section 504 of P.L. 93-112, is that: (1) handicapped students will be integrated more than ever before into courses that also include "regular" students and (2) facilities must be made accessible to handicapped persons. The latter factor is of particular importance to industrial educators. According to Section 504, the term facility means "...all or any portion of buildings, structures, equipment, roads, walks, parking lots, or other real or personal property or interest in such property." This means that all rooms, equipment, and processes used in industrial education programs be made accessible and useable by handicapped students. But, since industrial education equipment and facilities have not been designed to accommodate the handicapped certain modifications will need to be made. Modifications, however, need not be elaborate or even expensive. In fact, major equipment and facility changes are not advisable. The goal should be to make changes that will permit use by as many people as possible. Thus, total accessibility is not essential since handicapped individuals must learn to cope with certain barriers which they will surely find in the real world. A major problem facing industrial educators, then, is that of determining and making equipment and facility changes.

Unfortunately, except for certain architectural features, few ironclad guidelines can be offered. The reason is that handicapped persons like all "normal" persons are different. There are no two handicaps or handicapped persons that are identical.

General guidelines, however, can be applied. The model below can be used to achieve the goal of making accessible educational programs available to the handicapped. Notice that the model is commonly used to develop instructional programs for all learners. It is used here to emphasize that changes in the physical environment should be deliberately planned and only after other important interrelated factors are considered.

Perhaps the only fixed variable in the model will be that of program or course goals. For in order to provide equal opportunity for handicapped students the broad goals of programs and courses should be the same as those for non-handicapped learners.



FACTORS TO CONSIDER WHEN MODIFYING EQUIPMENT AND FACILITIES

The use of resources is vital to developing accessible industrial education programs for the handicapped. Personnel such as school psychologists, rehabilitation counselors, parents, specialists from organizations, and handicapped students can provide valuable information. This information should initially help instructors to understand learners in terms of his/her physical, intellectual, emotional, and educational characteristics. With this accomplished the resources can be used as an advisory council to help analyze the potential tasks involved so that handicapped persons can successfully complete the goals and objectives of a curriculum. From this analysis, potential problems and solutions can be identified.

Example: The goal of a student confined to a wheelchair is to become an industrial education teacher. An analysis of the material conversion and transportation processes involved in part of the curriculum (woods processing) reveals potential problems in leg room, reach, and equipment heights. These problems exist because most of the equipment was designed for use in the standing position. However, until the tasks involved are analyzed in light of the specific handicapped person, three important questions cannot be answered: (1) Can the tasks be successfully completed without modifications? (2) What changes will be required to assist the handicapped person perform the tasks? and/or (3) If the tasks cannot be performed successfully, what other learning strategy can be substituted that will allow the student to complete the curricular goals and objectives?

Answers to these questions should lead to valid changes of one or more factors shown in the model. Therefore, equipment and facility modifications must be considered and evaluated along with these other important factors. To do otherwise might result in physical changes that are too costly, unsafe, unnecessary, or that violate the rights of handicapped or even "regular" students.

A bibliography is available upon request. Write to the authors at this address: Department of Industrial Education and Technology, Ball State University, Muncie, IN 47306.

AIAA. W-1:00-7
INDIVIDUALIZING INSTRUCTION FOR HANDICAPPED. John M. Shemick,
Professor in Charge, Industrial Arts Education, Pennsylvania State
University, University Park, Pennsylvania.

As the prospect of mainstreaming children with special needs into industrial education ships becomes more and more a reality, many shop teachers have expressed their lack of confidence in carrying out their part. Their administrators indicated they saw no real problems, especially if teachers implemented individualized instruction. While teachers admitted that individualization was possible, they argued that it requires a great deal of time - a commodity already in short supply. Could modern computer technology help with this problem? If so, was it feasible for psychomotor activities to be translated into a computer program?

Another question was, "is it reasonable to assume that shop teachers have access to a computer?" A quick survey showed that most schools in Pennsylvania have computers or computer services available to them. Finally, with recent emergence of low cost desk top computers, computer capability seems to be within the grasp of most schools.

Identifying Psychomotor Elements. Fleishman (1970), in his work on developing a taxonomy of human performance, explored a number of systems for analyzing performance. One of the systems he developed was the Binary Decision Flow Diagram which identified 35 ability components which were grouped into six categories (Shemick, 1978). These categories and components was the base upon which could be easily incorporated into a computer program. However, when Fleishman's ability components were applied to the very common shop course of beginning woodworking activities, his manipulative abilities category needed greater specificity. Accordingly, twenty psychomotor skill elements were identified against which the common tools of the wood shop were analyzed. Twelve of the skill elements were grouped under dominant hand, namely:

1) twisting with thumb and index finger,
2) hand grasp (grip),
3) wrist flexing,
4) forearm hinging,
5) push and/or pulling with hand,
6) hand cranking (vertical or horizontal),
7) hand turning,
8) hand lift and return strokes,
9) drawing/writing,
10) eye-hand static coordination,
11) eye-hand dynamic coordination, and
12) eye-hand tracking.

The remaining eight were grouped under non-dominant hand:
1) grip,
2) thumb and index finger grip,
3) hand lift and return stroke,
4) hand turning, and
5) maintaining body balance,
6) Hand steadiness,
7) Hand eye static coordination,
8) Hand eye tracking.

Analyzing Shop Projects for Skill Requirements. A project data sheet was developed for coding all the skills that are required to carry out tasks or shop projects. Two simple, but typical projects were analyzed for their skill requirements, i.e., a wall plaque and a wall shelf. In filling out the data sheet, the teacher lists the operations in preferred priority.

The Computer Program Sequence. The computer program followed the typical flow of operations followed in carrying out a project activity, i.e., 1) preparation of material, 2) surfacing, 3) layout, 4) rough cutting of each part, 5) drilling, 6) cutting to shape, 7) smoothing edge, 8) final sanding, 9) assembly, and 10) applying a finish. Each of these steps contained a hierarchy of tool skills, for example, under rough cutting a student would normally use a crosscut saw to cut the material to length, however, if he/she was not able to execute that skill, a second choice would be a back saw, a third choice would be a coping saw, a forth choice would be a vibrating power jig saw, finally if none of this could be done, the student would have to refer to the teacher aide for help.

Computer Simulation. Two hypothetical student data cards were prepared and sent through the computer program to determine whether the program would actually work. This was done with the wall plaque project that has been coded. The cards were read into the computer which issued individual instruction sheets as a print-out. Accordingly, the first student who was unable to execute hand cranking was directed to ask for help in drilling the holes in the plaque. The second student who was unable to: 1) do hand cranking, 2) hand turning, 3) lift hand and return stroke, and 4) draw, was directed to: ask for help in laying out project and drilling the hole; and to sand paper the edge rather than filing it.

Summary. In answer to the initial question of whether it is feasible to translate psychomotor instruction into a program for individualizing instruction, we can safely say yes. That is, yes it is feasible for a simple project - like tasks in the instructional area of wood working. Our next step is to implement the system in a real shop with real students.

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STATE AND LOCAL ORGANIZATIONS

ACIASAO. TH-9:00-18

MANAGING A STATE ASSOCIATION.

Dr. Thomas R. Baldwin, Business Manager, Wisconsin Industrial Education Association, Associate Professor, University of Wisconsin-Stout, Menomonie, Wisconsin.

Many different approaches are used in organizing state associations and in providing these associations with continuity from year to year. This is an attempt to present one method of organization and some procedural techniques which have provided a great deal of continuity, effectiveness and efficiency in associations.

The use of a staff position such as an executive secretary is, in itself, not unique and many states utilize a person in this capacity to provide continuity and staff support to elected officers. This idea is valuable in that many elected officers do not have the flexibility, secretarial support, contacts and opportunities to provide adequate communication and services the way a consistant contact person can. The involvement of most elected officers and representatives of professional groups is quite short. For organizations, this means a continual change of ideas and goals which is good, but in some cases, it also means the loss of the reasons behind some of the things that were being done by an association. The ideas and directives of new people is vital for the continual existence and growth of an association. An association cannot be static; it must either grow or decline, but frequently due to the short term involvement of the leaders they tend to be reluctant to make any major decisions that will effect the organization during their term of office, or make decisions with little concern for an association's ability to carry on with these ideas or changes. To break out of a holding pattern of no change into control with the realism of proposed changes, there are a number of things that could be done by an association besides creating a staff position.

First, the association needs to reaffirm its goals. In all too many cases an association's goals were initially written upon the charter of the organization and have been rarely reviewed. A close examination of these goals may prove them to be completely irrelevant to today's needs or an association's present situation. Current and relevant goals should be organized and short, medium and long range objectives should be developed to assist an association in achieving their goals. A valuable assist in working with an association's goals and objectives can be acquired through the use of a survey to members or at least a sampling of members asking for input. Gather information on things members would like to see done, and things that would be extremely helpful to them.

Once a list of goals is established and objectives developed, it is important that a priority list be established so that the things that are identified as most important are the things that are done first. It is also important when establishing this priority list for the people making the decision to be aware of budgetary needs, operational procedures, time commitment, and the number and type of participants for effective implementation. Projections on the life expectancy of activities and any income potential would also be important input. A continuing activity needs procedural development to maintain continuity as the reins of activity leadership are passed from one person to the next. A method of evaluation of the success of an activity needs to be developed at the start so that concrete facts are gathered and considered in decisions about continuing or revising an activity.

It is extremely important that at the beginning of each year and with each new group of leaders that they examine the overall goals and objectives that were established by their predecessors for their continuing viability and appropriate priority. A changing group of officers may see new objectives that should be added, old objectives that they do not agree with and may want to completely rearrange the list of priorities to meet needs as they see them. After reviewing goals, the next step is to seriously examine each of the things that an association does and its relationship to the goals of the association. It is all tooeasy to develop a group of activities that are continued long past their usefulness.

Historical records should be kept from year to year on the objectives, their implementation and notation as to their success. This should also include a written description of the procedures utilized for implementation, handling financial matters and closing down an activity after it has been completed. These records should be available to officers, board members and participants in different activities as a means of conveying ideas that have been successful. This record would prevent the reinvention of the wheel by new people taking on responsibilities and relieve many developmental problems for them. This does not prevent the use of imagination in developing new methods of attempting something, but will provide a person with a starting point and direction if these are needed.

A written job description for each of the people involved in each of the different activities of an association, staggered terms of office for elected officers and representatives, and the use of a staff person as a continuity agent in an association should all provide for improved effectiveness of an organization.

ACIASAO. TU-1-2:30

NEEDS ASSESSMENT FOR INDUSTRIAL ARTS STATE ASSOCIATIONS.

John T. Fecik, professor, Cheyney State College, Cheyney, Pennsylvania 19319. John Y. Stoudt, Industrial Arts Instructional Leader, Norristown Area School District, Norristown, Pennsylvania 19403.

Needs assessment by the Industrial Arts Association of Pennsylvania has produced some long range goal development which has been carried out by a succession of Presidents 1976 to 1979. The result of the needs assessment conducted in 1976 will enable IAAP officers to plan for and move ahead toward the 1980's. The needs assessment was initiated by Gary Bowman, the twenty-fourth IAAP President. The survey was developed by an ad hoc committee and inserted in the Spring, 1976 issue of the *Pennsylvania Industrial Arts News*. Involvement of IAAP members was necessary to identify the needs.

Before the needs assessment survey, tabulations, implementation and goal setting priorities are discussed, it is important, we feel, to present some background information about the Industrial Arts Association of Pennsylvania. The IAAP was founded in 1952 at Cheyney State College by a group of concerned industrial arts educators. Its purposes are (1) to stimulate and strive for the improvement and strengthening of industrial arts educational programs in Pennsylvania as a vital aspect of education for all students on all levels and (2) to promote the improvement of the quality of instruction in industrial arts education by assisting those concerned to keep instructional content, methods and facilities current with the rapid changes in industry and technology. The IAAP is affiliated with the Pennsylvania State Education Association through its vocational and practical arts section, and the American Industrial Arts Association.

Pennsylvania industrial arts teachers have had a long tradition of participation in AIAA practically since its beginning. A Pennsylvanian, Tony Stavaski became the second editor (and printer) of *The Industrial Arts Teacher* in the early 1940's. Ken Brown, another Pennsylvanian, became the first Executive Secretary of AIAA in 1953 and remained the lifeblood of industrial arts professionalism. He was also important in organizing and establishing the IAAP in its infancy. The first industrial arts teacher from the secondary school level to be elected as President of the AIAA was Bill Wilkinson in 1961-1962. Other AIAA presidents from Pennsylvania were: Burl N. Osburn, 1955-1956; Earl M. Weber, 1964-1965, and George H. Ditlow, 1968-1969. Another Pennsylvanian served as Executive Secretary from 1966 to 1969, Ed Kabakjian. Numerous others have served as Vice Presidents, Conference Director and Editor on the AIAA Executive Board. Additionally, the IAAP Annual State Conference has been recognized as the best in the country.

The governance structure of the Industrial Arts Association of Pennsylvania is vested in the Executive Board with these elected officers: President, Deputy President, President-Elect, Vice Presidents representing each of 14 regions, Supervisors, Teacher Educators, College Students and Student Clubs. Appointed officers, with three year terms, are: Treasurer, Recording Secretary, and Membership Secretary. Other appointed officers to the Executive Board, with one year terms are: Conference Director, Chairperson of Publications, and advisors to College Students and Student Clubs. The addition of all chairpersons from each committee thereby constitutes the administrative body of the IAAP. These chairpersons do not vote on Executive Board actions. The Delegate Assembly consists of delegates from local, county or regional industrial arts associations. This assembly represents the membership of the Annual Business Meeting.

The publications of the IAAP are developed by the publications committee under Executive Board authority. The *Pennsylvania Industrial Arts News* is the official journal of the Association and is published three times a year. The *Conference Proceedings* are published annually and made up of the presentations from the past state conference. The *Proceedings* have been published each year since the 1966 conference. The publications committee has responsibility for monographs, brochures and bulletins. Only one monograph has been published and distributed to each member. Monograph One was dated 1972, and titled *The History of the Industrial Arts Association of Pennsylvania from Its Origin to 1968*.

The next publication to be edited and recommended for approval, and sponsored by the IAAP, was the *1978 Pennsylvania Industrial Arts Safety Guide*. The *Guide* was conceived and developed by the Safety Committee upon direction of the Executive Board and the related resolutions approved by the Delegate Assembly. This effort is only the latest of IAAP major activities to be made available for its members. The Curriculum Committee in 1969 organized four workshops to examine new and emerging curricular patterns for industrial arts. These workshops were designed to provide classroom teachers with knowledge of those innovative curricular patterns. During the 1969 and 1970 years, workshops again were the vehicle to help industrial arts teachers develop, write and evaluate behavioral objectives. The IAAP and Penn State University cooperated in 1975-1976 to identify competencies for beginning industrial arts teachers. Under a basic grant from the Pennsylvania Department of Education and additional financial aid from this association a monograph was published. It was distributed to every teacher who was an IAAP member. As you may now see, major projects were not new to Pennsylvania industrial arts teachers.

What was new was the process and the size of the prioritized task. In the Spring of 1976, a needs assessment committee was assembled in order to prepare a survey instrument to involve state members in long range plans for the future activities of the Association. The Executive Board approved of the needs assessment survey and the means to conduct it. When the IAAP President, one of its future presidents and the needs assessment chairperson poured over the final tabulations, they concluded that the results should be presented as a series of resolutions to the Delegate Assembly in November, 1976. A resolution was written for each of the major priorities identified and each was approved at the 1976 Annual Business Meeting. So it became the responsibility of the 1976-1977 Executive Board to project the development of the ways to solve the problems that members needs have projected. The first resolution was assigned by the 25th President to a newly formed safety committee. After receiving safety materials and manuals from a large number of states, the committee considered how these safety materials may be placed in the hands of industrial arts teachers. Their efforts began to gravitate toward the development of a practical safety manual. It was felt necessary to show teachers how to introduce a total safety/instructional program and how this affects teacher liability. The needs assessment process will now be discussed by John Stoudt, the 1976 Needs Assessment Chairperson for the IAAP.

In November, 1977, the safety and liability resolution from 1976 was approved again as a current resolution. The Chairperson of the ad hoc safety committee presented to the 1977-1978 IAAP Executive Board a report that specified objectives, time-lines, a stable of committee members, their duties and responsibilities, a proposed budget for printing 3,500 safety guides and a scheme for dissemination and proposed in-service workshops. The budget called for almost $20,000 while the IAAP budget was already cast at $26,000. The Association President, out of necessity to complete this project, formed a funding committee that would seek financial support for the project while the project work thundered on. What was surprising was that no one on the Executive Board ever suggested cutting the safety project money needs, curtailing its ambitions, or waiting for the funds to become available.

In December, 1977, a cost up-date on the safety manuals was prepared. The cost was reduced to $17,800 while increasing number of copies to 6,000. The distribution scheme was revised to include not only all industrial arts teachers in Pennsylvania but also administrators.

A meeting with the State Director of Vocational Education produced a probable source of funding for the safety project. A proposal was necessary. Up to this point, private foundations were being identified and considered as funding sources. While the chairperson of the safety and funding committees collaborated with the State Industrial Arts Advisor on the proposal, the safety committee was meeting, refining and writing. The $30,650 proposal submitted to the Pennsylvania Bureau of Vocational Education was broken into two separate proposals, one for development of the safety guide and one for the in-service workshop. Separate again was the printing of the guide pages. They were to be done through another Bureau contract. Somehow in the shuffle, the cover for the guide was lost. Two industrial firms engaged in the Safety business were approached and they undertook its cost and preparation. The IAAP Executive Board, at its spring meeting, heard progress reports from the involved committees, but again did not restrain or deter the project perpetrators. The writing and typing of the manuscript time-lines were fulfilled but artwork was delayed until August, therefore printing was delayed.

The Safety Committee became committed to presenting its in-service workshop at the Pennsylvania Department of Education Curriculum Conference in August, 1978. The intention was to train workshop presenters who in turn would organize and present local workshops on a statewide basis during the oncoming school year.

Within the workshop were to be discussions on various sections of the safety guide, how to use it, leadership development activities, historical background on the IAAP, a lab safety evaluation at a school location, the development of an inspection checklist and development of an in-service workshop proposal. T-shirts were awarded to all participants.

As the Annual State Conference in November, 1978 approached, plans were organized for dissemination of the Safety Guide. A presentation was made to the teacher educator group to make them aware that each undergraduate in their program would receive a copy. Lunch for the Safety Committee and those involved in the progress of the Safety Guide was held. The chairperson presented a pen from the National Safety Council to each person who contributed to the project.

Throughout the various stages of development of the Safety Guide, the IAAP President was kept fully informed of events and contributions. It was through such close coordination with the 26th IAAP President, the State Advisor, the Safety Chairperson and the Funding Chairperson that this project was completed within the scope for which it was originally designed. When the Safety chairperson presented his report to the 1977-78 IAAP Executive Board, he was given a standing and thunderous ovation. At the Annual Banquet, citations were presented to two individuals representing the industrial firms contributing to the cover, one to the individual and firm contributing the art work, and one to the Safety Chairperson, John Y. Stoudt.

ACIASAO. TH-9:00-16

SOME SELECTED CRITERIA FOR ORGANIZING STATEWIDE INDUSTRIAL ARTS MEETINGS.

G. Eugene Martin, Associate Professor, Miami University, Oxford, Ohio, and President of the Ohio Industrial Arts Association.

The proper organization of statewide industrial arts meetings is important to the health and vitality of the state association. Attendance at these meetings may be enhanced by selecting people to organize the meetings who have an expressed and concerned interest in the future of the state association.

The organizational structure of a state association may often dictate who will or will not be involved in the organization of statewide meetings. For example, the key organizing personnel may be elected by the association membership because they hold some office in the association or they may be appointed by an association official, e.g., the president, to serve on an organizing committee to plan the meeting. In either case the organizing people must exhibit several common characteristics that include at least the following: (a) an expressed interest in organizing statewide meetings; (b) the time to put forth the effort to plan the meetings; (c) a certain degree of administrative and leadership abilities that allows them to administer properly the necessary tasks and at the same time provide the leadership necessary to carry out the tasks; and (d) the willingness to work with people.

The expected size of a statewide meeting often dictates the type of facility necessary to house the meeting. Considerations should include the following: number and condition of sleeping rooms; space for school and commercial exhibits; room for meal functions; parking facilities; storage facilities; availability of meeting rooms; and, of course, the cost of all of these to the association or the membership. Each of these should be studied and analyzed carefully for potential cost and impact on the state association budget.

Some statewide meetings are planned to increase the income of the association while others are planned simply to provide a meeting arena to listen and exchange ideas with one's peers. There are various ways to increase an associations income through statewide meetings. Some of these include the following: (a) charging a registration fee; (b) charging commercial exhibitors for floor space to exhibit their products; (c) charging an "extra" amount for meal functions; and (d) charging a fee for participants to participate in special workshops sponsored by the association. While "a" and "b" above may bring large sums of monies into the state association, "c" and "d" usually are break even endeavors. Each state association should analyze its own situation before deciding how income may be increased.

The success of statewide meetings is often influenced by the programs planned for the participants. The types of programs scheduled should be indicative of the interests of the expected participants or the membership at large.

In addition, the identification of "hot" topics, e.g., solar energy, often increases attendance. Finally, the success of a meeting is often measured by how "busy" the participants are at the meetings. Programs that keep the participants active and engaged in discussions often are indicative of successful statewide meetings.

How does a program chairperson determine what topics are to be given at a statewide meeting and who shall give or present the topics? First, what topics should be presented? It was previously indicated that "hot" topics often provide the greatest amount of interest among the conference participants. These topics are often found by examining articles being written in journals in the field, e.g., School Shop, Man/Society/Technology, and Industrial Education. In addition, what are teachers talking about in the field? What are the discussion topics? One good way of determining this is to survey the membership. What are they most interested in as an industrial arts educator? Second, who shall present the programs? This is often the most difficult task. The program chairperson may choose the presenters, seek assistance from other conference organizing personnel, seek advise of local and state supervisors, and/or seek volunteers. The latter example is usually the least successful of all those listed. The goal, however, is to identify a variety of topics that will appeal to the widest cross section of the membership of the state association. At the same time, good presenters must be identified. Have your presenters ever presented their topic before an audience of peers prior to the statewide meeting?

Another consideration and criteria in organizing statewide meetings is the actual facility for the individual programs. While there may be rooms for a program in any one particular facility, rooms themself do not make successful programs. Rooms require good acoustics, lighting, ventilation, flexible seating arrangements, electrical outlets, and sometimes special provisions for other types of utilities, e.g., water, gas, oxygen. All of these contribute towards successful programs. A program chairperson should contact the presenters well ahead of the meeting to identify room requirements. In addition, the program chairperson must project the anticipated audience size to determine the size of room required for the program as well as the seating arrangement.

Finally, a state association should advertise the statewide meeting as much as possible. This means good advertise of available resources within the state, e.g., state association newsletter, affiliates newsletters, local news media within the area in which the meeting will be held. In addition, a state association should take advantage of "calendar of events" that are printed in many of the trade and professional journals in industrial arts and vocational education. And finally, the best advertising is the personal invitation.

STUDENT GROUPS

A:ACSA. T-10:45 - 13

FILLING ANOTHER GAP. Ronald E. Baker and Norman J. Colle, Industrial Arts Students, Purdue University, Department of Industrial Education, West Lafayette, Indiana.

In the public schools, it is a well-known fact that a shortage of Industrial Arts teachers exists. Therefore, it is easy to understand why there are no qualified Industrial Arts substitutes. Any time an Industrial Arts teacher is absent, no industrial education takes place, because the present substitutes have absolutely no Industrial Arts training.

This situation became apparent in our area when a local junior high school called our Department wanting an IED student to substitute in their general shop class.

From this event a substitute teacher program, utilizing eligible college students, was developed. This program gives the student substitute valuable classroom experience and at the same time fills the gap in the public schools caused by teacher absence.

Using this program, the schools can now seek out semiqualified Industrial Arts substitutes. Until this time, the chance of getting a substitute with an Industrial Arts background was nonexistent. Now substitutes with two or three years background are available.

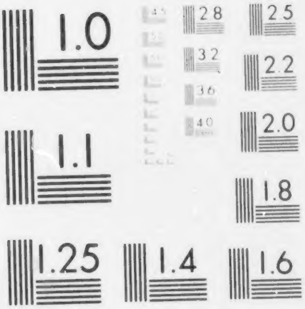
Before, when a teacher was absent, little or no learning continued during that absence. Since our program started, we have had very good feedback as to the results of our substituting. The learning process has continued when our program was used. Teachers no longer need to lose classroom time because of an absence.

The benefits which the college student can draw from this program are numerous. Now, the student has a chance to make his/her course of study relative to the classroom a full year before student teaching. This will allow the student to develop many classroom procedures prior to student teaching.

It is generally understood that in most instances, the classroom atmosphere for a substitute can at times be very hectic and frustrating. This characteristic of substituting gives the student a real taste of learning how to control a classroom. Valuable discipline concepts can be established prior to student teaching. Considering the present trends in many schools, knowing how to establish good classroom discipline can be invaluable.

Another aspect of this program which benefits the student is the pay. Not only is the student developing his/her teaching skills, but is also getting paid for it. This added income becomes a nice fringe benefit.

Because of the nature of substituting, very often one must take over a class with no time for preparation. Therefore, to aid the substitute in presenting pertinent subject matter on short notice, a substitute teacher "Survival Kit" was developed. This kit is made up of educational games which can be adapted to any subject matter in minutes. This kit is centrally located so that a student, upon being called, can pick up whatever games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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

or devices are necessary to teach on that day. The substitute will then have enough material to deliver pertinent information on virtually any area of Industrial Arts.

In order to successfully set up such a program, we would like to suggest the following procedures:

1. Determine the local need. This will be the first contact with the public schools.

2. Allow sufficient time to make the initial setup. Don't try to start your program before you are ready. This can be very frustrating to you and to the schools, and may reflect badly on your program.

3. Determine whether liability coverage for your substitutes is available at a reasonable price. One possibility is the NEA, but you should research this.

4. Certify your students to substitute teach. In Indiana a student must have sixty semester hours at an accredited university to qualify. This is a time-consuming task and should be started at least one year in advance, as re-certification must be done each year.

5. You are now ready for the development of the "Survival Kit." There are no established contents of this kit. Any game which can be easily adapted to any subject matter can be made part of the kit. One such game, "Mix-Up, Match-Up", developed by Dr. James Fales, Purdue University, is illustrated in the March issue of Industrial Education magazine.

6. Finally, set up the scheduling procedures with the public schools. Present a schedule to the schools showing when each participating member is available. To fully utilize the program, the schools in our area agreed to permit two students to cover the same job, each teaching half a day. In this way, should a student have only a half day open, he/she could still participate in the program. Should two students cover the same job, they merely split the pay for that day.

This is a very versatile and beneficial program. If utilized, it cannot help but fill the gap of an absent teacher.

TEACHER EDUCATION

AIAA. T-9:00-1
FOSTERING PROGRAM IMPROVEMENT THROUGH PLANNED CHANGE. M. James Bensen, Assistant Dean, School of Industry & Technology, University of Wisconsin-Stout, Menomonie, Wisconsin.

Change is a way of life, and education by definition is in the business of initiating, enhancing, managing and evaluating change. Educators are thus "change agents"! If people who are under our direct influence do not change, then we as professionals are in serious trouble. A paradox exists, however. "If education is so involved with change, why is it that we as educators are so often criticized by society for resisting change?"

To foster change and thus bring about improvement, we need to better understand it. If change is approached through the avenue of "improvement," it receives less resistance from those involved in it. There are several basic assumptions relating to improvement:

- everyone and everything can be improved
- to improve, change must take place
- there is a natural resistance to change
- there is a process of change
- one must be continually changing
- the rate and direction of change is our major concern

It must also be pointed out that there are several different types of change. These changes are of differing degrees and can be categorized as follows:

- alter: a partial change; identity is preserved
- vary: irregular or intermittent change
- modify: minor or moderate change
- transform: change in form or function
- convert: strongly change to suit a new function

Change must also take place in an existing environment. Each of these situations (environments) are unique because of the people and resources that make them up. To bring about change, one must know that "environment" as well or better than anyone who is in it. These situations involve perspectives, values, attitudes, knowledge, capabilities and viewpoints that comprise an extremely complex set of relationships.

There are four basic models for change that must be utilized in concert with each other. These models are:

- rationale: a research and development model that assumes reason and evidence. This model dictates that "needs assessment" and documentation are conducted and in place before decisions are made.

- social: a communications oriented model. This approach is analogous to the agricultural agent who gains trust and works with the grass roots professional. The success of this model hinges on personal persuasion and a leader who in our profession would be called an educational development officer.

- political: a power and authority model. Change in this mode depends upon the position of control and an identified hierarchy. Many societal institutions use this model well, however, educators in most cases are quite unsophisticated in its effective use.

- emotional: a problem solving model. This dictates the use of either positive or negative humanistic psychology. Changes brought about through this mode involve the person throughout the process so that they feel to be an important part of the improvement.

Bringing about positive change is a complex and fragile process. To be effective as a change agent we as professionals need to be keenly aware of the process and to give it our full attention.

AIAA: Tue/February 25, 1979 - 3:00-4:30

PROFESSIONAL COMPETENCIES FOR UNDERGRADUATE INDUSTRIAL ARTS. Marc A. Caron, Assistant Professor, Division of the Industrial Technology, Department of Industrial Arts, Norfolk State College, Norfolk, Virginia.

This paper is an outgrowth of research undertaken by for the Virginia Teacher Education Council and is aimed at identifying minimum competencies applicable to the Professional Course work of undergraduate Industrial Arts majors in Virginia. For purposes of this study Professional course work included all non-technical types of study and included such areas as Foundations, Curriculum Construction, Senior Seminar, Student Teaching, and Methods of Industrial Arts.

The intent was to generate and validate a list of minimum competencies that would be pertent to all professional areas taught in undergraduate courses, and leave the specific selection of competencies to the individual institutions.

A review of the literature produced three generic competencies for teacher education programs (Craig, 1974) It was felt that, with slight modification, these competencies represented the general spectrum of content that could be ascribed to professional course work. In modified form these competencies are:

I. The prospective undergraduate Industrial Arts teacher will design and implement instructional strategies which facilitate pupil learning in the Industrial Arts Classroom.

II. The prospective undergraduate Industrial Arts teacher will coordinate school and community features to sustain and improve favorable learning conditions in the Industrial Arts Classroom.

III. The prospective undergraduate Industrial Arts teacher will diagnose educational needs and prescribe appropriate instructional solutions for students in the Industrial Arts Classroom.

Further review of literature and curriculum guides suggested that most of what is encompassed in various professional courses can be subsummed under one of these three competencies. Thus they were adopted as the content universe for professional course work in the investigation. At this point it should be noted that the intention of this work was to move from the general to the specific in a manner that would allow individual instructor atonomy in selecting specific course content necessary to attain competency levels, while attempting to identify the minimum competencies needed to be attained.

The three major competencies, above, it is felt, do define the scope of the concern, though it is recognized that they are too broad to be highly useful in developing specific courses. The second phase of the investigation centered on refining each of the three major competencies into component parts which would provide more specific direction.

These Sub-competencies, again are somewhat broad, for example Major Competency I had a sub-competency "Identify and develop appropriate supplemental instructional aids/resources that facilitate ongoing classroom activities." This is specific in that students will develop instructional aids/resources, yet is general in that it does not specify the quantity, quality, theme, or subject area to be focused on. It is felt that this is the domain of the individual instructor. If this were to be specified a rather extensive list could evolve for each sub-competency, and perhaps, in the future, should be, though it was not a part of this investigation. From this investigation we do know that Teacher educators preceive this sub-competency as a minimum attainment for undergraduate Industrial Arts majors, as posed to a subcompetency which Stated "Develop courses of study commensurate with his/her point of view concerning Industrial Arts education." Having eliminated competencies in this manner we have established a base line for further refinement.

In analyzing the major competencies, we identified 33 sub-competencies for number 1, 27 for number II and 19 and for number III. This list was then sent to all Industrial Arts teacher educators at four institutions in Virginia. Each was asked to respond to the items as being required, uncertain, or not required for inclusion in undergraduate professional course work for Industrial Arts students. In all 30 instruments were sent with a 70 percent response rate. A 70 percent cut-off point was adopted which reduced the list to 29 sub-competencies number I, 12 for number II and 18 related to III.

These 59 sub-competencies represent what Virginia teacher educators preceive to be the minimum for professional undergraduate course work. Though there is no mandate to implement them it is hoped that they will provide a guide line in developing curriculum. In selecting these 59 there are two additional tasks that need to be undertaken by potential adopters. The first is to select out those that are pertent to a given course, eg Foundations, and sequence them for instructional purposes. The second is to analyze each into more specific statements that pertain to the learning situation.

As a result of this exploratory effort two areas for further study can be suggested. The first is to expand the scope of the present investigation to a national level. In doing this it is suggested that all original competencies be included. In completing this task the remaining competencies might be further analyzed and validated to provide more specific sub-competencies that might be used in developing instructional packages. The second area is similar to the first, however the population might be defined in terms of secondary Industrial Arts teachers, administrators, and supervisors. This would provide a more correlated effort between colleges and universities, and may change the nature of the work undertaken at this level.

CRAIG, SAM B. (COORDINATOR) A RESOURCE FOR DEVELOPING COMPETENCY BASED TEACHER EDUCATION PROGRAMS. BUREAU OF ACADEMIC PROGRAMS, PENNSYLVANIA DEPARTMENT OF EDUCATION, 1974.

AIAA. TH-1:00-11

COMPETENCIES FOR EVALUATING INDUSTRIAL ARTS STUDENT TEACHERS. Leon L. Copeland, Assistant Professor, Department of Industrial Education and Technology, University of Maryland, Eastern Shore, Princess Anne, Maryland.

In many instances, industrial arts student teachers are evaluated on the same criteria as student teachers from other disciplines. These assessments are based on the assumption that skills and behavior (competencies) desired of student teachers in other subject areas can be equally applied to industrial arts student teachers. However, the nature of the laboratory phase of industrial arts teaching requires additional competencies which may not be needed by student teachers in other subject areas. These unique concerns of industrial arts teachers were pointed out by Johnson (1966:2) and Bonfadini (1976:84).

Since research on competencies for evaluating industrial arts student teachers was limited, a study was conducted at Virginia Polytechnic Institute and State University during the winter of 1977 to identify and validate competencies for evaluating industrial arts student teachers.

The procedure used in conducting the study was a modified Delphi technique. This procedure involved three rounds of iteration between each of three groups of industrial arts educators with controlled feedback of information between rounds. The technique allowed opinions to be systematically combined; therefore, through collective group judgements a knowledgeable consensus was reached within each group. The groups were composed of classroom teachers, teacher educators, and supervisors. Each group constituted a Delphi panel which allowed three Delphis to be conducted simultaneously.

Competencies for the study were identified by searching related literature and existing evaluation instruments in subject areas of general education and industrial education. All competencies during each round were listed on a modified institutional goals instrument as developed by Uhl (1971). Competencies were rated on this instrument according to a five-point scale of importance: 5 - of extremely high importance, 4 - of high importance, 3 - of medium importance, 2 - of low importance, and 1 - of no importance. Each group rated seventy-two competencies on the first questionnaire and submitted additional competencies which they felt should be included. After additions were made, 77, 75 and 73 competencies were rated respectively by classroom teachers, teacher educators, and supervisors during the second and third rounds.

Competencies were listed under the following categories: (1) teaching methods and techniques, (2) laboratory and classroom management, (3) organization of instructional materials, (4) technical knowledge and manipulative skill, (5) student evaluation, and (6) personal qualities.

Twenty-seven classroom teachers, twenty-seven teacher educators, and twenty-four supervisors completed each round of the study. Based on third round ratings for each group, triadic listings of teacher competencies were compiled and rank ordered according to mean values of importance. Mean values for classroom teachers ranged from a high of 5.00 to a low of 2.88. Mean values for teacher educators ranged from a high of 5.00 to a low of 2.40 and mean values for supervisors ranged from a high of 5.00 to a low of 3.29. Each group rated more than 90 percent of the competencies as being "of extremely high importance," "of high importance," and "of medium importance." Perusal of ratings indicates each group considered competencies listed under the categories of personal qualities, teaching methods and techniques, laboratory/classroom management, and technical knowledge and manipulative skill to be major evaluative criteria. Competencies listed under categories of student evaluation and organization of instructional materials were rated slightly lower than competencies under the preceding categories.

According to the rate of consensus and comments gained from each group of educators, competencies identified in this study span a wide range of teaching skills and behaviors expected of industrial arts student teachers. Based on these results an evaluation instrument for industrial arts student teachers is being developed. The instrument will list competencies on a summated type scale with descriptive behaviors for each competency. Descriptive behaviors will be listed according to three degrees of performance: most desirable, desirable and undesirable. Three numerical values will be associated with each behavioral description which will allow evaluators to arrive at a summative rating for each competency. After rating each competency, a mean rating can be computed and translated into a letter grade.

The instrument will be field-tested with groups of student teachers to establish reliability. Validity of competencies was achieved through use of the Delphi technique. Since the content of this evaluation instrument will be based on the results of a national research study, it will be the first of its kind for evaluating industrial arts student teachers.

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2. Johnson, V. B. "Supervision of Student Teaching in Industrial Arts: Personnel and Practice." Unpublished Doctor's Dissertation, University of Missouri, 1966.

3. Uhl, N. P. Identifying Institutional Goals: Encouraging Convergence of Opinion Through the Delphi Technique. Durham, NC: National Laboratory for Higher Education, 1971.

ACIATE. T-9:00-13
PUTTING PURPOSE INTO THE NON-CLASS EXPERIENCES OF OUR GRADUATE STUDENTS. Michael J. Dyrenfurth and F. Milton Miller, associate professors, Industrial Education, University of Missouri-Columbia.

Discussion Leaders: Joseph Wujek, University of Northern Iowa; Lisa Schachter and Jeanne Weber, Bowling Green State University, Ohio; Kenneth Petty, Texas A & M University; Kevin Morgan, University of Missouri-Columbia; Peter Tom, Montclair State College, New Jersey; Gregory Nichols, Kent State University, Ohio; Kenneth DeLucca, University of Wisconsin-Stout; Laura Patey, Glassboro State College, New Jersey.

Recorder: Marc Caron, Norfolk State University, Virginia.
Chairperson: Robert G. Hammond, University of Northern Colorado.

A set of categories that classify the graduate student's non-course/non-credit activities by their key features was prepared. Each of the nine categories was briefly described. Through this process the conceptualization of the non-class component of a student's program was revealed. The categories were not listed in any order of relative importance nor were the subdivisions within each category arranged in any order of perceived importance.

Categories of Activity

1. Institutional/Departmental Involvement
2. State and National Administration of Education
3. Evaluation
4. Teaching and Instructional Support
5. Research
6. Professional Relations
7. Writing
8. Association/Fraternity Involvement
9. Student Organizations

In small groups, a discussion leader--a graduate student--guided the discussion and exploration of:

1. The relative merits of each category and its best description, and
2. The relative merits of a specifically assigned category and its subdivisions.

Each participant was asked to assist the discussion leader in addressing, brainstorming and exploring each of the following tasks:

1. The addition to, deletion, or modification of the nine categories in order to develop a system that comprehensively surveys the major non-course/non-credit experiences of value to aspiring students.
2. Ranking of the relative importance of each CATEGORY in terms of its potential contribution to the professional growth of students.

3. With respect to the single category assigned to your discussion group, the addition to, deletion, or modification of the listed subdivisions in order to comprehensively survey the major types of student experiences subsumed by that category.
4. Ranking of the relative importance of each subdivision (within your assigned category only) in terms of its potential to the professional growth of students.
5. Providing such additional input as you may feel is pertinent.

When the small groups finished, each discussion leader presented an oral report of the results of their group's deliberations.

Additional information may be obtained by writing the presenters at the University of Missouri-Columbia.

ACIATE. W-1:00-15

DOCTORAL PROGRAMS IN INDUSTRIAL ARTS EDUCATION: THEIR RANKING AND CRITICAL CHARACTERISTICS.

Ronald L. Koble, Associate Professor, Industrial Arts Education, The Pennsylvania State University, University Park, Pennsylvania.

This program reports an ACIATE funded research study relating to the critical characteristics that distinguish between high and low ranked doctoral programs for industrial arts education personnel. The study is being conducted in two phases.

> Phase I - A random sample of ACIATE members were asked via a mailed opinionnaire to list the five outstanding doctoral programs for industrial arts personnel. The rankings were analyzed in terms of the respondents' academic rank, position, teaching experience in higher education, highest degree earned, and geographic location.
>
> Phase II - An in-depth analysis will be made of the three highest and lowest ranked doctoral programs in terms of their faculty, students and graduates, curriculum, and facilities. These data, by comparison among programs, will identify the critical characteristics that distinguish between high and low ranked programs in industrial arts education, industrial education, and technology education listed in the *Industrial Teacher Education Directory: Institutions, Degrees, Data and Personnel, 1978-79*.

Literature. The major thrust of evaluating graduate programs has occurred in the last 50 years. Early studies were supported by the American Council on Education and generally involved asking the officers of a professional association in a specified field to identify the 100 top scholars in the field. These top scholars, then were asked to identify the best graduate programs in the field. It is important to note, however, that these early studies omitted all professional fields such as law, engineering, and education. Examples of these studies are:

1924 - Hughes
1934 - Hughes
1959 - Keniston
1966 - Carter
1971 - Roose and Anderson
1977 - Lapp and Lipset

Studies in some disciplines have been done periodically. In industrial arts education, studies have been completed in the past and a review of this literature is provided by Wentling in ACIATE Monograph 4, *Graduate Programs in Industrial Education*. These studies can be grouped as follows: program development and status studies, program assessment, and follow-up studies. This monograph also includes an excellent report pertaining to the status of graduate programs in industrial education by Harris and Tomlinson.

ACIATE Monograph 1, *An Analysis of Graduate Work in Institutions with Programs for Industrial Arts Educational Personnel* by Miller and Ginther is another publication of this Council that reports detailed information about graduate work in our field. The monograph was published in 1965. In both of these publications, no attempt to rank graduate programs was made.

Other significant studies pertaining to doctoral programs in industrial arts education completed relatively recently that looked at doctoral programs, exclusive of follow-up studies include those by Liu (1975), Wolansky and Resnick (1978), and Wright (1977).

Also to be noted is the work currently underway by two ACIATE Committees. Both the Accreditation Committee and Graduate Studies Committee are developing "Standards and Guidelines for Graduate Program Evaluation." The general scope and thrust of studies pertaining to doctoral/graduate programs has been briefly reviewed to provide some background about them. The final report will include more details.

Phase I. In Phase I of the study, a 10 percent random sample of ACIATE members was selected using the latest membership lists available; stratification of the sample on any basis was not possible. The opinionnaire was mailed to 116 council members. It had been developed previously during a pilot study and its validity and reliability were determined statistically and found to be acceptable. Responses to the six questions on the opinionnaire based on the 80 usable (70 percent) replies returned without any follow-up are summarizing using frequencies. Further analyses and explanations will be included in the final report. A total of 94 replies (81 percent) were returned, but 14 were not usable.

Respondent's Academic Rank: Professor - 27, Associate Professor - 28, Assistant Professor - 15, Instructor - 2, Teacher - 6, and Other - 2.

Respondent's Present Position: Administrator in Higher Education - 11, Graduate Student - 1, Supervisor - 2, Teacher Educator - 60, Teacher - 4, Other - 2.

Respondent's Higher Education Teaching Experience: 0-7 years - 21, 8-12 years - 22, 13-19 years - 20, and 20-33 years - 17.

Respondent's Years Since Graduation by Degree:

	Bachelor's	Master's	Doctor's
Range	3-42	1-37	0-29
Mean	2.42	2.52	2.38

Criteria Used to Judge Graduate Programs: Educational Facilities - 4, Reputation of the Faculty - 29, Reputation of the Graduates - 16, Reputation of the Program - 26, Reputation of the University - 0, and Other - 5.

Ranking of Graduate Programs:

1. The Ohio State University
2. University of Maryland
3. Texas A & M University
4. University of Missouri
5. University of Northern Colorado/ Arizona State University

Phase II. Phase II of this study is currently underway. It is the critical part of the study since it should provide some insights about what distinguishes between high-ranked and low-ranked programs. Among the information to be gathered via interview, search of catalogs, feedback from graduates, and correspondence with faculty and other professionals is:

1. Curriculum/Program.
2. Faculty/Personnel.
3. University/College
4. Facilities
5. Financial Support for Program.
6. Admissions Policies/Graduation Requirements/Degrees Offered

My sincere thanks to ACIATE for establishing the Research Grant Program that supported, in part, this study.

AIAA. W-3-4:30

TEACHER PREPARATION IN TECHNICAL EDUCATION AT AN URBAN UNIVERSITY.

EVERETT J. LANIK, ASSISTANT PROFESSOR, TECHNICAL EDUCATION DEPARTMENT, UNIVERSITY OF HOUSTON, HOUSTON,TEXAS

The purpose of this paper is to present the results of a program we think is a unique application of serving community and regional needs at the University of Houston in preparing individuals for teaching positions in occupational-technical programs in community junior colleges, technical institutes and industry in addition to preparing industrial arts teachers.

The University of Houston's 384 acre central campus is located in an urban area approximately three miles southeast of downtown Houston, Texas. Of the total enrollment of 29,665 for the spring 1979 semester 93 percent of the students reside off-campus and commute. The average age of the students is 24 years for men and 23 years old for women. Surrounding the city of Houston whose population is 1.7 million and the University of Houston are eight community junior colleges which provide most of the transfer students for the University of Houston.

During the past few years, the problem that has plagued the University of Houston teacher educator faculty who normally prepare students for teaching in industrial arts programs in the public schools of the area was the lack of students graduating from high school enrolling in industrial arts teacher preparation programs. Although a chronic and desperate need exists for industrial arts teachers in the area, the salaries paid to graduates are not competitive with graduates of other technical disciplines. Therefore, the available supply of students have been encouraged to pursue studies in other areas. This being the case the faculty had to consider and seek an alternative source of student clientele in order to utilize the faculty personnel, classrooms and laboratory facilities. It was decided to expand the teacher preparation program for industrial arts teachers to include preparing teachers for the occupational-technical programs in community junior colleges and teachers for various programs in industry. In addition to high school seniors, student recruiting now includes community junior college occupational-technical instructors without bachelor degrees, community junior college students with an associate of science degree, and other assorted students who desire to further their education and who may be interested in teaching as a profession.

A curriculum was developed by the Technical Education Department (TED) to accommodate the new source of students. In general, the departmental offerings provide experience in developing teaching skills directed specifically toward technology-based course work. The degree program may include subjects offered by other departments within the College of Technology, the college in which TED is situated, or the program can utilize expertise developed in technical areas such as data processing, dental hygiene, instrumentation and fire science technology, which are transferred from other institutions.

To determine the progress of the TED graduates and the results of the TED curriculum design a survey was mailed to 47 graduates of which 49 percent responded. The average age of the respondents at the time of graduation was 34 years old. A total of 87 percent were transfer students with 70 percent of these students transferring from community junior colleges. Those students transferring from community junior colleges transferred an average of 59 semester hours. We found that 70 percent of our TED graduates were part-time students while attending the University.

It was found that 22 percent of the TED graduates are now pursuing teaching careers, 48 percent have received promotions to managerial type of positions, 4 percent are attending graduate school and 26 percent have listed "no change" in status. As a further indicator of effectiveness of the TED program, those graduates who are not now teaching reported without exception that they would consider a teaching position in the future.

The starting salary for the first position immediately after graduation as reported by 83 percent of the respondents indicated that they received an average of $1340 per month and 53 percent indicated receiving a salary increase since graduation averaging $224 per month. There is also an apparent positive feeling among the respondents that additional academic instruction is a worthwhile goal because 48 percent stated that they were planning to continue their academic education, while 52 percent indicated that perhaps they would continue.

The original perception used in the development of the TED curriculum design to accommodate the new source of students appear to be sound. The significant and heartening fact is that the TED faculty are apparently accomplishing their intended professional goals by influencing students of diverse backgrounds to become teachers. This is a fact since without exception those respondents to this survey who are not now presently teaching plan to do so in the future.

ACIATE. T 10:45-10

TECHNOLOGY AS A CONTENT BASE FOR INDUSTRIAL ARTS TEACHER EDUCATION.

Donald P. Lauda, Dean, School of Technology, Eastern Illinois University, Charleston, Illinois.

The key to addressing ourselves to curriculum development is to face cultural reality. Historical evidence exists to prove that technology is a pre-condition for culture and therefore must be taken into consideration when designing content and instructional strategy. Traditionally, administrators have responded by altering titles of courses and programs without substantially altering content. The use of an adjective before the term technology appears to be the means to approach this vast concept.

Economists, historians, psychologists and educators have compiled an impressive body of knowledge for us to use in curriculum change. Yet, much of this represents disparate findings. The reasons are myriad but must be massaged into a meaningful form if we are serious about educating (as opposed to training) humans for life in a technological world.

If we are not in a post-industrial society, we must admit that the foundation is being laid for one. It is knowledge that propels us into deeper stages of technological development. Industries have become science-based and thrive on theoretical knowledge. It is no wonder that such groups as Research for Better Schools and writers, such as Harmon (1977) consider the growth of knowledge to be of primary concern.

Theodore Levit (Cross, 1974) stated that the railroads stopped growing not because passengers and freight declined, but because they were railroad oriented instead of consumer oriented. Perhaps industrial arts education is criticized by so many because we are industrial arts oriented and not consumer oriented. The profession must see the global village as its source of content and we cannot deny the fact that technology is a primary determinant for culture change in every society.

Throughout our rich history productivity has dominated our thinking that is the amount of output generated per unit of capital and labor input. This equation focuses on "things", forcing us to focus on only one variable of the technological order. We focus on "things" in spite of the fact that per capita is becoming less and less satisfying as an indicator of well-being. We focus on things in spite of the fact that most of us are technological determinists, that is we believe that technology has a close relationship to the way people live. Most of us invoke, implicitly or explicitly, a model of social change based on technological growth realizing that there is a cultural lag drawn along with it. Therefore, the kindest, most humane, most educationally sound venture we can take is to introduce students to their reality. Emphasis is placed on the word their. For the youth of today, the future is the missing link between education and life. To disregard cultural reality and the future would be evidence of sheer naivete. The price of naivete would be making ourselves as educators comfortable by remaining with objectives, concepts, principles, virtues, and philosophies of the past while molding a whole generation for a lifestyle that will not exist. Can anyone say that they want to follow that irrational path?

Virtually all studies done about the study of technology report similar findings. Some of these are:

1. It is multi-disciplinary.
2. It involves the study of a technical and socio-cultural component.
3. It is convenient and rational to study technology by dividing it into production, communications and energy/power.
4. Such study raises value questions.
5. Such study reveals technology as a primary determinant of cultural change.

Industrial arts therefore, must evolve around two elements:

1. To generate a philosophy of technology in all students.

*2. Up-grading of its content and instructional strategy in the areas of production, communications, and energy/power.

By the time the student has completed a B.S. degree in industrial arts he/she should have been introduced into such areas as:

History of technology
Invention and innovation
Finite resources/infinite demands
Adaptation to rapid change
Finding, retreival, and synthesis of information
Control of technology
Forecasting
Resources of technology

Obviously such information should be presented at all levels (K-Doctorate) with the complexity increasing accordingly. By the time a student completes a PH.D. degree he/she should be well versed in all of these themes. At the same time the graduate must understand that technology has technical and socio-cultural components. To study one without the other distorts the true meaning of technology and its impact on people.

Industrial arts teachers do not need authority to do this, but they need leadership. If the teacher education programs do not provide the leadership, who will? We have the potential of impacting thousands of children. We dare not provide them with models that are unrealistic. After all my children are part of that group.

1. Cross, K.P. College board review. Spring, 1974.
2. Harmon, W.H. The coming transformation. The Futurist. February, 1977.
3. Pytlik, E., Lauda, D. and Johnson, D. Technology, change and society. Worcester, Davis Publications, 1978.

*It is time for the teacher education leaders to form a consortium for identifying the issues in the study of production, communications, and energy/power. We need to share our successes and failures as we seek uniformity in our efforts.

AIAA Th 1:00-2:30
Industrial Arts - Teacher Corps. Lyndall L. Lundy, Professor, Vocational Education Department, University of Wyoming, Laramie, WY.

THE TEACHER CORPS AND INDUSTRIAL ARTS

This presentation is given to describe the Teacher Corps and primarily the nature of an experience had by Susan St. John, an intern in the Teacher Corps, and Bob Owens, an inservice Jr. High I.A.teacher. Most teacher corps programs are and have been in disciplines other than industrial arts- math, science and social studies.

Susan is completing, this semester, her two year Teacher Corps internship in Industrial Arts at Johnson Junior High School in Cheyenne, Wyoming. As a part of her internship she has to be enrolled at the University taking course work and completing requirements for a Master's Degree and certification in Industrial Education. Last summer-1978- she and Robert Owens, enrolled in a course entitled "Education-Industry Experience" for 8 semester hours of credit. As I mentioned before, Bob was involved at the time in the inservice aspect (school staff training) of the Teacher Corps. He is a junior high industrial arts teacher in the same system. For this experience they were allowed to develop a plan or proposal for what they wanted to accomplish in the course. This proposal consisted of a scheme that would integrate pre-service and inservice teacher education in a worthwhile and special learning experience. The end result of this proposal was a contract resulting in joining together the instructional resources at the University of Wyoming, the public school, and the private secotr, that enabled Bob and Susan to study the construction industry in a unique way. At least it was unique at the University of Wyoming in industrial arts and also had never been done before under the auspices of the Teacher Corps. No such course was available at the time on the University of Wyoming campus. One of the requirements for this experience was that they be involved, from beginning to end, in the construction of a house. That is, they were to be actively involved from the acquiring of building permits and land throughout the construction and finally in the sale of the house.

As a Professor at the University of Wyoming in Industrial Education, I was involved in supervising the learning experiences that took place at the building site in Cheyenne and in evaluating related research papers. Also, close supervision was maintained throughout the complete job by Ken snyder, Contractor. Susan and Bob did not actually build the house on their own but were present and worked with the contractor during the pre-construction, construction and post-construction phases.

Let me share with you a rationale for what was done and how it relates to industrial arts.

First, let us look at the history of the Teacher Corps and its basic purposes. The Teacher Corps was established by Congress in 1965. It is a federally funded program designed to help colleges, universities, and school districts introduce changes in the way teachers are prepared and utilized. A special goal of each Teacher Corps project is to provide children from low-income families better educational opportunities. Teacher Corps is a coordinated effort among school districts in low-income areas, their immediate communities and nearby universities. In view of this, emphasis is placed on two major objectives: improvement of the local school learning climate and instructional program and the development of innovative methods for teacher training at the University level. It is primarily with the latter with which this presentation deals.

Originally Teacher Corps was established with the following general purposes:

1. To strengthen the educational opportunities available to children in areas having concentration of low-income families.
2. To encourage colleges and universities to broaden their programs of teacher preparation.
3. To encourage institutions of higher education and local educational agencies to improve programs of training and retraining for teachers and teacher aids (1:15).

More specifically, the amended higher education act of 1965 required that Teacher Corps programs be designed to:

1. Attract to low-income areas, and train inexperienced teacher interns who will be made available for teaching and in-service training to local educational agencies and who will work in teams led by an experienced teacher.
2. Attract community volunteers to serve as part time tutors or full-time instructional assistants in programs carried out by local educational agencies and institutions of higher education serving low-income areas.
3. Attract and train educational personnel to provide relevant remedial basic and secondary educatinal training, including literacy and communication skills, for juvenile delinquents, youthful offenders, and adult criminal offenders.
4. Support demonstration projects for retraining experienced teachers and teacher aids serving in local educational agencies.

On a national level most universities working with Teacher Corps indicate that their programs have resulted in positive change. The University of Wyoming is no different in this regard. Over the country changes have included revised curricula, expanded internships for all student teachers, and changed admission policies. Teacher Corps has also caused universities to see the need to offer special training for students seeking assignment to low-income area schools.

Teacher Corps has played an important role in matters such as the introduction of new courses which we are telling you about today. Also, through the efforts of the corps' new staffing patterns, individualized instruction and other educational advances have come about. For example, Teacher Corps projects have tried several different experimental designs. Each of the original designs utilized one or more of the following training frameworks:

1. Training complex, variations of the teacher center idea;
2. Competency based teacher education;
3. Training for implementing alternative school designs;
4. Interdisciplinary training approaches; and
5. Training for the systematic adoption of research findings.

The new Teacher Corps agreements do not require that any one of these frameworks be specified. The Cheyenne Teacher Corps site is considered to be an alternative type framework in an interdisciplinary context. That is, interns are from different disciplines. Incidentally, such Teacher Corps arrangements are now changed from two year to five year programs. IN CONCLUSION, it is hoped that this unique experience will serve as a model for others in Teacher Corps and for participating schools and universities. It worked well for all participants in our situation. The needs of the University and the Teacher Corps were met in an unprecedented way.

AIAA, Special Interest Session, TH-1:00-2:30

TIME-SHORTENED INDUSTRIAL EDUCATION PROGRAMS.

Michael J. Pierson, Director, Department of Occupational Education, Southwest Texas State University, San Marcos, Texas.

With the high amortization costs of technical courses, the changes brought about by technology, and the increase in the number of adult college students, colleges and universities need to explore new curricular alternatives. Frankel and Harrison estimated that the number of high school graduates will peak in 1978 and the number will decline annually through 1984-85. By 1986 they estimated that the number of 18 year olds will have declined by about 16.7% from 1978 and the number of high school graduates will have declined 14.7% from the 1978 figures (1977, p.32).

The adult clientele brings with them a wide variety of prior learning experiences that have implications for curricular alternatives in industrial education. It is important that we do not project into the future with outworn assumptions from the past or entertain preoccupation with retrenchment. It is evident that important technological, social, and economic changes are occurring that should engage educators in more thoughtful and analytical thinking about alternatives in industrial education programs.

EXTRAINSTITUTIONAL LEARNING

The concept of time-shortened programs for adults with competencies acquired from their environment (extrainstitutional learning) has received increasing attention since 1970. These programs grant credit for competencies learned outside the sponsorship of a university; therefore, time-shortening or time-liberating the programs. These programs rest on the following assumptions:

- .Our society abounds with resources for learning.
- .All learning is valid regardless of its source.
- .Learning and experience are inextricably linked together (learning while doing).
- .All experiences that reflect learning should be recognized and validated.

For comparative purpose we need to investigate the assumptions of traditional programs and investigate their validity. Traditional programs rest on the following assumptions:

- .Possession of a large number of semester credit hours is indicative of an educated person.
- .Valid learning occurs only under the sponsorship of an accredited university.
- .Tests, grade point averages, residency requirements, and course requirements provide programmatic qualitative assurances.

Extrainstitutional learning or learning that accrues outside the sponsorship or aegis of a legally authorized and accredited post-secondary institution can be divided into two categories: noncollegiate sponsored instruction and work/life experience. Noncollegiate sponsored instruction is a form of extrainstitutional learning that is sponsored by nonaccredited associations, business, industry, government, or military to develop knowledge, skills, and values. *The National Guide of Credit Recommendations for Noncollegiate Courses* and *The Guide to the Evaluation of Educational Experiences in the Armed Services by the American Council on Education* gives credit equivalency recommendations for some 800 courses conducted by some 70 organizations that could be articulated within an educational program. These documents recommend credit awards on the basis of comparable instructional situations within institutions of higher education.

Work/life experience is another form of extrainstitutional learning that develops knowledge, skills, and values as a result of nonsponsored environmental experiences. The phenomonology of experience suggests that the flow of human existance should be compatibly dovetailed with schooling. Most purists bristle at the thought of awarding credit for learning acquired outside the sponsorship of an accredited institution. This is partly due to the inability of most to consider education as both process and outcomes. It should not matter within what context the process occurs. Educators should be concerned whether the outcomes acquired in real life are functionally equivalent to those acquired in an accredited institution.

RATIONALE

The rationale for granting credit for extrainstitutional learning rests on the principle of "Learning While Doing". The psychological literature is replete with evidence that supports this principle (Pierson, 1974, pp. 11-14). A concrete transaction with one's environment is comprised of an act performed upon things in the environment which results in a consequence. These concrete transactions form concepts which mediate future transactions. This model is a self-correcting cybernetic cycle. For the learning model to be effective, the consequences of behavior must be allowed to impinge on the individual to facilitate altering the conceptual schemata.

Human life operates in numerous transactional (experiential) areas within the environment among which learning can be found (Dewey, 1949, pp. 103-143). Most of the transactional areas are not associated with formal schooling. When we analyze our learning environment we find that there are three domains of experience that have behavioral similiarities. These categories or transactional areas are: university sponsored experiences, noncollegiate sponsored experiences, and work/life experiences.

The translation of extrainstitutional learning into academic credits can be accomplished by analysis of transactions. Analysis of transactions is a systemic analysis of how and at what level people transact with their domains of experience. These transactions or competencies can be identified as outcomes and can be evaluated in terms of their level of sophistication or complexity. Arranging these competencies in a taxonomy from simple to complex will facilitate determining at what level competencies acquired in real life are functionally equivalent to those acquired in a collegiate sponsored experience.

CONCLUSIONS

It should be the goal of educators to make full and effective use of all educational resources. Post-secondary institutions should develop alternative programs that consider the needs of mobile and older adult students and allow them to demonstrate educational accomplishment without the traditional time and space requirements.

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Dewey, John. Knowing the Know. Boston: Beacon Press, 1949.

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ACIATE Th-9:00-11 9:00-10:15 a.m.

ACCREDITATION OF INDUSTRIAL ARTS TEACHER EDUCATION PROGRAMS. W. D. Umstattd, associate professor, Academic Faculty of Industrial Technology Education, The Ohio State University, Columbus, Ohio.

The term "accountability" is being applied to more and more segments of our society. This referent suggests a level of quality control. Evidence of quality denotes accountability to someone for something. In the field of education, goals and objectives are used to measure knowledge gained and skills acquired by learners at various levels.

For industrial arts teachers and teacher educators measures of accountability are being developed by the American Council on Industrial Arts Teacher Education (ACIATE). The ACIATE Accreditation Committee is preparing evaluative criteria for undergraduate and graduate teacher education. These criteria could be used by state and national accrediting agencies to review and renew teacher certification periodically as mandated or requested.

Documenting Undergraduate Programs

The ACIATE has approved and published the *Standards and Guidelines for Undergraduate Program Evaluation in Industrial Arts Teacher Education.* Standards identify program areas for which colleges and universities are accountable. Guidelines specify the measureable components of the programs to identify how the standards are met.

There are ten areas of concern for evaluating undergraduate programs within the publication. They are:

Section I: Curricular Goals
Section II: Teaching Specialty Content: Industrial Arts
Section III: General Studies
Section IV: Teaching and Learning Theory Studies
Section V: Practicum (field experience)
Section VI: Instructional Resources and Facilities
Section VII: Organization (academic unit)
Section VIII: Faculty (qualifications)
Section IX: Student Services
Section X: Evaluating, Program Review, and Planning

Each section has one or more standards and several guidelines for measuring the standards. For example, standards for curricular goals should:

- Develop in each student an insight and understanding of industrial practices and the impact of industry on American culture.
- Discover and develop talents of students in the technical fields and applied sciences.
- Develop technical problem-solving skills related to materials and processes.
- Develop in each student a measure of skill in the use of the common tools and machines.

The guidelines for this section specify the rationale and structure for a K-12 program in industrial arts teacher education.

Documenting Graduate Programs

A companion ACIATE publication, *Standards and Guidelines for Graduate Degree Program Evaluation in Industrial Arts Teacher Education*, is being prepared. It states that graduate programs should:

- Develop master teachers through the improvement of technical and pedagogical competencies appropriate for the classroom and/or laboratory.
- Contain the necessary program elements for individuals who wish to become teacher educators and researchers.

- Provide programs leading to professional career changes in fields of education such as guidance, supervision, or administration at various educational levels.

The above statements relate to goals for the masters, specialist, and doctoral degree levels. Variations in the requirements for degrees and/or certifications will have to be interpreted for each section in the standards and guidelines.

There are seven sections of concern being established. They are:

- Section I: Curricular Goals
  - A. Standards for Content
  - B. Standards for Design
  - C. Standards for Research
  - D. Standards for Graduate Courses
- Section II: Residency
- Section III: Faculty
  - A. Standards for Individuals
  - B. Standards for Teaching Load
  - C. Standards for Professional Maintenance
  - D. Standards for Support Personnel
- Section IV: Students
  - A. Standards for Admission
  - B. Standards for Retention
  - C. Standards for Supervision
- Section V: Resources and Facilities
  - A. Standards for Resource Material
  - B. Standards for Facilities
- Section VI: Evaluation and Planning
  - A. Standards for Evaluation
  - B. Standards for Planning
- Section VII: Control
  - A. Standards for Internal Control
  - B. Standards for Exterior Control

Each standard has one or more guidelines prepared in a question format.

Reasons for Documentation

Graduate and undergraduate degree programs are evaluated for various reasons. One purpose is to maintain levels of quality expected by state and national teacher education accrediting agencies. Another purpose is to improve the institution's instructional program. A third purpose is to inform visiting teams of evaluators who may not be familiar with goals for all levels and educational disciplines. These ACIATE documents provide professional society documentation for accountability in industrial arts teacher education.

AIAA. Th-9:00-9

CURRICULUM MODEL FOR TECHNOLOGY EDUCATION: TEACHER EDUCATION IN POWER AND ENERGY TECHNOLOGY.

Michael R. White, Associate Professor, Industrial Arts Education, Pennsylvania State University, University Park, Pennsylvania.

Industrial arts has always been concerned about the future in respect to its present and past. The goals of industrial arts have reflected the comprehensive nature of the field, but the operational programs in the schools have very often been a very narrow and so trade or job related that the general education value was often submerged. Nowhere was this more evident, within the discipline, than in the content area of power mechanics.

Despite our philosophies, goals and objectives, our courses within this traditional area of industrial arts have been implemented as small and big internal combustion engines, their operation, repair, maintenance and vehicles. Activities were delimited to taking apart and putting together engines of various sizes and the subsequent support systems of the internal combustion engine and their vehicles. The appropriateness of this kind of activity as THE IA PROGRAM of power mechanics has been in question for years, but the absence of a viable laboratory alternative has narrowed the options for the practicing teacher.

To make this content area of industrial arts an effective contributor to the future of industrial arts, it is necessary to DESIGN and IMPLEMENT effective power technology teacher education programs and to support power technology programs in the k-adult school programs. To make power technology consistent with industrial arts goals, objectives, and curricula, IT MUST be broad-based and reflective of the needs of society and the individual; not the competencies of a specific trade or occupation. To accomplish this development power and energy technology, teacher education must be based on: THE FUTURE-THE DISCIPLINE-PROBLEM SOLVING-TECHNOLOGY-ACTIVITIES-AND CONCEPTS.

This type of curriculum could be called "power technology" if it were not for the fact that in the recent past of industrial arts, several programs at the college and public school level, and even some recent textbooks have been called "power technology," but are no more than engine courses and only touch on, if at all, the broad-range content of the field of power. It is because of this terminological corruption by teachers and authors that the more comprehensive term of Power and Energy Technology (PET) is used to describe this curriculum thrust. By definition, power and energy technology is that part of industrial arts education which addresses itself to the sources, conversion, control, transmission and utilization of power and energy, and the problems and benefits of that process.

This type of definition requires a type of teacher education curriculum dealing with the all-encompassing field of power and energy from the sources of power (solar-nuclear-fossil-geothermal-chemical-biological) the conversion of power (electrical, mechanical, direct) the control and transmission of this power (electrical, mechanical, fluidic) and the utilization of power in the home, transportation, industry, and the problems/benefits/ opportunities in these areas.

This technology requires teacher education programs to have courses and laboratories which are broad and relevant to the all encompassing field of power and energy technology. Instructional facilities should offer these four components:

1. broad and relevant to the all-encompassing field of power and energy technology.
2. offer experiences with a variety of PET.
3. provide realistic and appropriate models for public school facilities in PET.
4. provide for research and development both in PET and in curriculum development for public school PET.

The courses for the would-be teacher of Power and Energy Technology must give him or her the basic competencies to deal with present day "power" programs, but it must also provide the prospective teacher with the capability and the DESIRE to improve upon the current programs to provide current and future orientation to Power and Energy Technology. The teacher education program should have a three prong approach.

1. Deliver technical and cognitive competencies within the comprehensive field of PET,
2. Deliver curriculum building and operational curriculum testing competencies in relationship to PET experiences, and
3. Incorporate these competencies into a working philosophy and a desire to build, operate, and improve PET programs for the schools.

The purpose of this Power and Energy Curriculum at the college level is to provide individuals who are going to teach industrial arts with the generalizable skills, knowledges, theory, and practice to understand and effectively contribute to the field of power and energy through their action with the technology and with their organizational and teaching skills to bring others into the realm of effectively understanding and contributing to the concerns of power and energy and its interface with man.

TEACHING AIDS

AIAA. T-9:00-2
MICRO-COMPUTER APPLICATIONS IN INDUSTRIAL ARTS. Robert D. Brook,
assistant professor, Industrial & Occupational Education Department,
Mississippi State University, Starkvill, Mississippi.

Never has man lived in an age that technology has advanced so rapidly and made such a dramatic impact on society. Even more disturbing is the fact that history tells us our future will probably be no different. In fact, projections into the near future indicate that technology will advance at an ever increasing rate. Such a rate will stagger even the well-trained mind, not to mention those of our society who know little or nothing about the technological world in which we live.

The degree of impact on society which man has recently witnessed is best illustrated by the introduction of the hand held electronic calculator into the market place. This tiny wonder replaced the slide rule and the electro-mechanical calculator in a survey that left manufacturers stunned. These small, but highly sophisticated, electronic packages are but an indication of how modern electronics will continue to influence and drastically alter the future.

The same metal oxide semi-conductor technology that made possible the tiny electronic calculators and other products like the sophisticated digital watches advertised daily across the country has opened the door to a vast new world in electronics. Through this technology a complete computer can be fabricated on a single chip of silicon measuring only 5mm by 5mm. This micro-computer can easily perform the functions normally performed by larger computers that fill large rooms and require tons of climate control equipment to insure proper operation. This powerful micro-computer may well be the next technological advancement that revolutionizes everything from operating our home, car, office, and laboratory, to teaching our students. It will not replace the classroom teacher but rather become a powerful aid to enhance the instructional process.

The basic parts of a micro-computer are similar to those of a large computer. They include the central processing unit (CPU), memory, input/output devices, and power supply. Software or programs of instructions are combined with this hardware to produce a functional micro-computer system. The major advantages of a micro-computer are (1) small size, (2) very low cost, and (3) ease of reprograming. Disadvantages include (1) limited instruction sets, (2) slow operational speed, (3) only 8 bits of data can be handled at a time, and (4) restricted external communication devices. Today special languages are used to interface man with the micro-computer. These include such powerful languages as "Basic", "APL", "PASCAL", "FONTRAN", "COBOL", etc.

When purchasing a micro-computer system several factors must be considered to insure a good investment. (1) Does a need really exists that can be met with the system? (2) Should you buy now or wait for prices to drop? (3) What system should be purchased? (4) Where should the system be purchased to receive the best service, backup, etc.? (5) What peripherial should be purchased? (6) What software is available for the system? (7) Is the system easy to use by staff and students? (8) How good is the past performance of the system? (9) How reliable is the system? (10) Should a single board or multi-unit micro-computer be purchased? (11) What is the full cost to get a system to meet identifiable needs? (12) What are the interface capabilities of the system.

The advantages of the micro-computers over present day larger computers will result in finding the micro-computer applied to many new areas in education, industry, and business. Areas of application include: (1) Control of other devices, machines, and systems, (2) communications between office and library, home and office, school to home, etc., (3) computations and graphical analysis, (4) simulation and modeling and analysis, (5) organization of records and data, (6) recreation, (7) home use, (8) education, and (9) profit. The application to be found in the industrial arts laboratory are even more exciting and rewarding. A micro-computer could be used to: (1) keep track of time, (2) generate tests and manuscripts, (3) grade or score tests, (4) inventory tools controls, (5) machines, (6) limit student access to dangerous equipment, (7) control student movement from area to area, (8) monitor laboratory safety conditions, (9) provide security during laboratory periods as well as during off periods, (10) control and monitor clean-up chart activities, (11) planning instructional activities, (12) allow students to calculate quantity and cost of materials for projects, (13) organize and program a modern industry mass production activity, (14) generate project plan sheets and steps of procedures, (15) develop drawings and plot graphs, (16) provide computer assisted instruction for students who need additional instruction to succeed in the program, (17) analyze test results, (18) limit machine use to only those students who have been checked out to use a particular piece of equipment, (19) keep the teacher advised on machine maintenance schedules, (20) plan work for a day, week, month, or year, (21) aid in the statistical analysis of data, and (22) provide immediate access to students records as well as print regular graph reports. These are only a few examples of how a micro-computer can be used to enhance any industrial arts program. Other applications are strictly limited by one's imagination and the desire to add new life to an existing program through utilizing and teaching the latest concepts of today's exciting technology.

AIAA Wed 9:00 - 10:15 W. R. Forkner

COMMUNICATING INSTRUCTION WITH TRANSPARENCIES

Teaching Impact can be increased by using transparencies which are well-designed through the areas of:

SUITABILITY

Message should be applicable to students in class as amplification of study content.

LEGIBILITY

All learners in the classroom or laboratory must be able to see and understand the message on the screen.

ATTRACTIVENESS

Transparencies should be attention getters to cause students to want to learn and pay attention.

Developing ideas; visuals are most practical when developed to augment, to amplify lectures or presentations. Working from lesson plans, the aids may be designed in outline form, as an aid to note-taking, as emphases for main topics, in illustrations - graphs - charts, and for supplementary materials to be covered in discussions.

First time use for a visual might well be a quickly developed aid, and upon use if it is found to be practical, should be up-graded to the quality one desires to project. However, if the transparency fails to be worthwhile, it should be discarded. An instructor should present information on the screen of the same quality of workmanship that students are expected to perform. As computer programmers say, "Garbage in = Garbage out." Quality of projected visuals must not be Garbage.

Attractive visuals add to teaching effectiveness. If all transparencies are black lettering or typing on a plain white screen, the potential impact for learning is lessened. With the variety of materials available, making transparencies in color is no more problem than working with ordinary black on clear. Distributors of thermographic transparency making materials sell, in addition to black on clear, black on pale yellow, pale blue, pale green and light pink. Also available, are master sets which print colors on clear backgrounds, colors are: red, blue, green and purple. One of the problems noticed with these materials is that the imprint tends to fade. No doubt the makers will overcome that problem with advanced technology. One should realize that color will not make a poor visual good -- but it makes a good one more attractive which helps students concentrate on learning because the information presented to them varies in appearance as well as in content.

Advantages of transparencies are many. Usually the same kinds of information are presented to learners on either the chalkboard or by overhead projection. Once the chalkboard has been erased, there is no retrieval of that material. Transparencies may be saved for use by students who were absent, as an aid in studying for tests, and for use when lesson content will be presented again. An instructor with multiple sections can save much time in developing transparencies as opposed to re-drawing or writing the same information on the board time and again. Oftentimes the "action graphics," writing or drawing on clear acetate during lectures or discussions are the very best planning aids for developing quality visuals for future teaching.

The principal advantage of using the overhead projector is that the instructor faces the class in a well lighted room. Therefore it is possible to view the learners and see how they are accepting the presentation -- see problems -- respond to questions or discussion. One does not face away, nor try to "teach the wall."

There are several processes for making transparencies. It is surmised that the most often used method is writing or drawing directly on plastic surfaces with either a grease pencil or a wick-tip fluid marker. This action is roughly equal in teaching to work upon a chalkboard but most people indicate that writing at the stage of the projector is easier than the enlarged writing necessary at the board.

One of the quicker methods on making transparencies is to run a heavy carbon content master through a thermographic reproducing machine. Published materials printed in black ink from texts, magazines and news print provide quality copy for visuals. Drawings in india ink also reproduce nicely. Pencil work, except where there is a very heavy deposit of carbon from a soft lead pencil (HB and F series) is not quite as suitable as india ink work. "Press-on" pressure sensitive lettering is ideal, except that heat from the copy machine causes letters to lift off the master. Apply "frosty-on-the-roll" clear plastic tape over the letters and the heat has no ill effect in lifting letters from master.

This presenter has found that writing, lettering or drawing through the "one-shot" carbon paper (which is half of the regularly used office Copy Set) makes excellent thermographic copy for transparencies. It is possible to on the copy paper, making a carbon deposit right on the back side. Although the copy is reversed, a visual made from that can be projected very nicely just by turning the plastic sheet over.

A problem encountered with newsprint is that the paper is thin and ink on the back registers in the thermo process nearly as well as that on the desired face of the paper. To overcome this problem, it is possible to remove most of the printing from the back side by pressing cellophane tape to the unwanted copy, then pull the tape off with care. Most of the ink is stripped off with the face of the paper surface when the tape is removed.

Another preparation for transparency making is done with the aid of electrostatic copy machines (Xerox and others). Copy from these machines is produced in a good carbon-base which, when processed in thermographic equipment provides excellent visuals. Some electrostatic copy makers also have plastic sheets which can be printed in the machine for direct production of transparencies. It is possible too, to create full color visuals on those machines which have full color capabilities for paper or plastic prints.

Drafting instructors whose labs contain blueprinters have very good potential for making transparencies by Diazo process. The method is identical to making blueprint/whiteprint copies on paper, except that the image is exposed on sensitized plastic sheets and developed in the amonia fume section of the printer. The image on acetate requires longer exposure than paper, and by following the manufacturers instructions, good copies are made. The original is prepared on velum or tracing paper with india ink, drafting line tape or an opaque blockout such as Parapaque for good, sharp clean images on visuals. Advantages of diazo transparencies over other types are that colors are far less subject to fading, will not smear, and the plastic sheet is smooth will lie flat, rather than wrinkling which occurs with thermal systems.

Transparencies are used in the classroom through a number of techniques. The whole visual is shown most often, but portions may be covered and revealed when necessary and needed. Overlays provide segmented information, each successive overlay building to the whole, useful when showing manipulative activities, drafting, design, structures, etc.

All in all, good visuals make a good teacher more effective in communicating instruction.

AIAA W - 3:00-4:30

Developing Color Slides With Ease. David K. Gore, Instructor, Department of Industrial Technology, University of Northern Iowa, Cedar Falls, Iowa.

As we enter a day and age of declining enrollments and ever decreasing budgets it becomes important to take advantage of any cost saving steps available. One such step is for teachers to produce their own slide series for instructional purposes rather than purchasing them. The feasibility of such a task is well within the realm of possibility for most teachers. Contrary to popular belief, processing color slides is a very easy procedure. It also does not require expensive or elaborate equipment. A daylight developing tank, an accurate thermometer, a clock or timer, seven eight ounce bottles or graduates and a squeegee is all that is needed to process rolls of 35mm slide film.

There are two concepts that need to be dealt with when considering a slide series project. These are basic color theory and slide film exposure principles. Explained very simply these are:

1. Color Theory--Visible white light is made up of red, green and blue light in equal amounts and this is what the film records. Color slides must filter out the unwanted portions of the white light as it passes through the transparency. This is accomplished by using dyes of complementary color to the white light. These are magenta, the complement of green; cyan, complement of red; and yellow, complement of blue.
2. Exposure--Slide films are reversal by nature. This means that during the exposure a negative image is formed and developed and then the film is reversed chemically and the remaining unexposed portion forms a positive image. Based on this it becomes evident that an overexposure will result in a slide that appears TOO light when projected. Conversely, an underexposed slide will appear TOO dark.

During processing there are many changes taking place in the emulsion layers of the film and a brief description is listed below. Understanding these will make toubleshooting easier if the slides do not turn out.

1. First Developer--develops the recorded latent image. This is a negative image and would appear similar to any black and white negative since there is no color present at this time.
2. Reversal Bath--chemically reverses the image from a negative to a positive. This is a chemical exposure of the previously unexposed and undeveloped silver halides in the film.
3. Color Developer--develops the silver halides chemically exposed by the reversal bath. As the developer oxidizes it combines with chemical couplers to form dyes. This is the first time color appears in the process.
4. Bleach--converts the silver halides to soluable salts.
5. Fixer--removes the soluable salts (silver halides) and leaves only the three complementary dye layers: magenta, cyan, and yellow.
6. Stabilizer--reduces tension to aid in drying and also contains a type of formaldehyde to preserve or increase the permanence of the dyes.

While there are several companies that supply slide films and processing chemistry the author prefers Kodak Ektachrome film and Unicolor chemistry. The processing is detailed below. Since temperature is important, a water bath in a dishpan, darkroom tray, etc. serves very effectively to establish and maintain the required temperatures.

PROCESSING INSTRUCTIONS FOR CONVENTIONAL FILM TANKS

Film must **NOT** be subject to light until completion of Reversal Bath step.

STEP	SOLUTION	TIME	TEMPERATURE	REMARKS
1.	First Developer	6 ½ min.	100°F (37.8°C)	Agitate first 15 sec., then 2 sec. each 15 sec. thereafter. Include drain time in total time.
2.	Water Rinse	2-3 min.	92-102°F (33-39°C)	Fill and drain tank 6 times. Total number of rinses is important.
3.	Reversal Bath	2 min.	92-102°F (33-39°C)	Agitate initial 10 sec.
4.	Color Developer	6 min.	99-101°F (37.2-38.3°C)	Agitate same as first dev.
5.	Stop Bath	1 min.	92-102°F (33-39°C)	Agitate same as first dev.
6.	Water Rinse	2-3 min.	92-102°F (33-39°C)	Change water in tank at least 6 times. Time not critical.
7.	Bleach	3 min.	92-102°F (33-39°C)	Agitate same as first dev.
8.	Fixer	2min.	92-102°F (33-39°C)	Agitate same as first dev.
9.	Water Rinse	2-3 min.	92-102°F (33-39°C)	Change water in tank at least 6 times. Time not critical.
10.	Stabilizer	½ min.	Ambient	Agitate initial 10-15 sec.
11.	Dry		Not over 104°F (60°C)	

After the film has been dried it is cut into individual frames and mounted in slide mounts. For maximum savings it is suggested that film be purchased in 100 foot rolls and bulk loaded into reusable cartridges. For the same reason gallon quantities of chemical concentrates, which can be mixed in desired amounts as needed, and boxes of 1000 slide mounts should be purchased. By taking advantage of these methods of purchasing a savings of approximately 50 to 80% can be realized over equivalent amounts of film purchased in standard rolls and processed through a local processing service or photography store.

In conclusion, making color slides is easy, inexpensive, and fun. All instructions are included with both film and chemistry and anyone capable of reading and telling time can produce good slides.

AIAA. W-1:00-2:30

PRODUCING QUICKIE FILMSTRIPS. Richard Henak, professor and Richard Barella, associate professor, Department of Industrial Education and Technology, Ball State University, Muncie, IN 47306.

Filmstrips are an economical way of presenting information, are convenient to use, and are flexible enough to be used with small or large groups.

Numerous companies provide a wide variety of well planned and produced filmstrips on a wide range of topics. Unfortunately, teachers of specialized subject matter and of students with unique learning or physical characteristics often find it difficult to obtain filmstrips that satisfy their needs. Concerning this problem, there is some bad news and there is some good news. The bad news is that producing the typical filmstrip is complicated, time consuming, and expensive. In addition, it requires specialized expensive equipment and skilled personnel. The good news is that materials and processes have been developed so that with a minimum of time and experience, with inexpensive materials and readily available equipment, and with a knowledge of your subject matter you can produce useful filmstrips quickly.

HANDMADE FILMSTRIPS

Inexpensive kits of materials used to produce handmade filmstrips are available through school supply stores and catalogs. These kits include blank film, felt markers, planning templates, storage containers, and instructions. Some even include splicing equipment so that handmade sections of filmstrips can be spliced to commercially produced sections or so that mistakes can be edited out of the finished filmstrip.

The blank film which is available in a variety of lengths, is cut to width and has sprocket holes punched to correspond with 35mm photographic film.

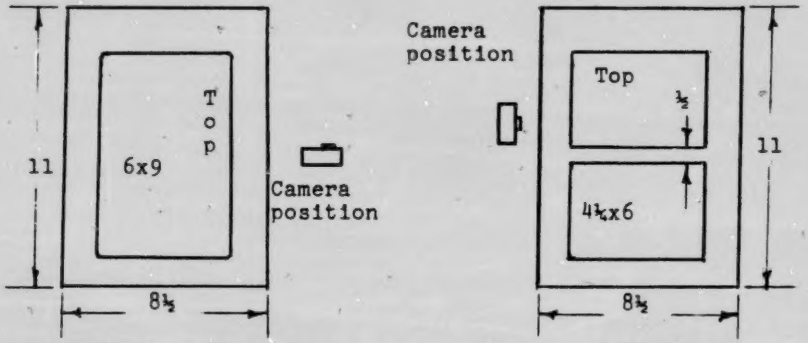
There are two kinds of film--a clear film and a frosted film. It has been our experience that the frosted film is the most versatile and easiest to use. The frosted side of the film is very receptive to 2H lead pencils, colored pencils, permanent markers, carbon typewriter ribbons, and India ink.

After the image is placed on the frosted film, the background can be transparentized by spraying it lightly with clear acrylic lacquer or enamel.

SIMPLE PHOTOGRAPHIC FILMSTRIPS

A second method of producing quickie filmstrips requires a bit more equipment and time, but the results are worth it. This method is a photographic method that requires a 35mm full frame or ½ frame camera with a copy stand, some Kodalith ortho negative film, 8½"x11" extremely white paper, and black felt markers.

Copy is drawn on 8½"x11" white paper with black markers. Be sure your lettering and visuals are legible. Use either template A or B, depending on your camera, as your guide:



"A" for ½ frame camera "B" for full frame

Figure I. TEMPLATES FOR CAMERA COPY.

Photograph each frame in the sequence it will be shown. Refer to Figure I for the orientation of your copy with the camera.

After the film is exposed send it away to be processed or process it yourself. It is easy, quick, and fun to do.

If you develop the skills needed to produce quickie filmstrips you will be able to enrich your instruction by providing instructional materials that are "custom made" to reach your specialized instructional objectives and/or unique student characteristics.

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1. Barry Instrument Corporation, 1156 N. Batavia, Orange, CA 92667, (714) 639-4602

2. Charles W. Clark Co., Inc., 564 Smith Street, Farmingdale, NY 11735.

3. Prima Education Products, Hudson Photographic Industries, Inc., Irvington-On-Hudson, NY 10533

AIAA T-9:00-11
MICROCOMPUTERS IN EDUCATION. Dr. William H. Rigby, Associate Professor, Department of Industry and Technology, Northern Michigan University, Marquette, Michigan.

Prior to 1965 few educators used computers in their educational efforts because of three limiting factors: Lack of knowledge about computers--Excessive cost--Batch job processing. These factors retarded the acceptance of computers by educators until technological advancements and a restructuring of society's acceptance of computers contributed to an affordable and acceptable computer system for today's educational environment.

The technological developments necessary for the placement of computer power in the hands of the general public can be traced to 1971 with development of the first microprocessor by Intel Corporation. This single integrated circuit provided tremendous computing power and allowed a wide variety of applications at a reasonable low mass-production price.

A further development occurred in late 1974 when MITS Corporation announced the development of the Altair 8800 microcomputer. This computer, making use of newly developed technology, brought computers to the people and encouraged the concepts of distributed computing and computer hobbiests.

In the few years since 1974 the field of microcomputers has mushroomed. Magazines are sprinkled with computer advertisements, electronics component stores have them on display, hobbiests have them at home, and scores of small businesses use them for business applications.

This wide acceptance by the non-academic segment of society has caused a number of educators to reevaluate the earlier excuses for not using computers such as cost, lack of background, and system organization. Analysis of these excuses today will indicate that all three are no longer applicable. The cost has fallen from $10,000 to $15,000 to under $1,000 for a complete, stand alone, interactive system. Teacher background, though still a consideration, is less of a deterrent due to the simplicity of today's programming languages such as BASIC and PASCAL. In addition, the acceptance of computer games, calculators, and computer toys by society has virtually forced the application of computers in today's classroom.

Microcomputers find application in the following segments of class operation: Data Storage and Retrieval--Recordkeeping--Exam Grading--Word Processing--Extra Curricular Activities--Testing--Problem Solving --CAI/CMI. While each of these uses is important, a special comment is appropriate for the use of the computer in testing and computer assisted instruction (CAI). These two applications alone will introduce more students to the use of computers and electronic systems than any other application.

Students seem to have gotten used to learning from a television and generally feel quite comfortable with calculators. These experiences allow the microcomputer to fit into the same category and receive the same acceptance. The micro is not threatening to the students, it is actually a thrill to make it work.

Individualized instruction and variable-paced instruction are easily accomplished using a microcomputer. Student assessment quizzes can be computer administered and scored along with more comprehensive monthly or semester tests. Branched programmed instruction can accommodate all ability levels. It patiently responds to the remedial student while challenging the accelerated student.

The reality of purchasing a microcomputer system focuses on the wide range of micro-based systems on the market today. A representative group is listed below in a categorized form for easy recognition.

- Microprocessor Trainers
  - E & L. Mini-micro Designer
  - Heath 6800 Microprocessor Trainer
  - Signetics Instructor Trainer
- General Purpose
  - MITS/PERTEC Altair
  - IMSAI 8080
  - Heath H-8
  - Southwest Technical 6800
  - Processor Technology - SOL
- Board Level Computers
  - RCA COSMAC
  - KIM - 1
  - Super KIM
- Packaged Computers
  - Commodore PET
  - Radio Shack TRS-80

Each of these pieces of hardware has an application in the educational environment. The microprocessor trainer and the board computer are typically found in electronics and science labs while general purpose and packaged systems are appropriate for all academic areas.

Most computer systems today use the same CPU integrated circuit chip and electronic organization. Therefore, system advantages are often based on other factors such as factory support, service, hardware, accessories, and, perhaps most important of all, the availability of software.

The question of software is one that lingers from the pre-1974 microcomputer days and is still a major consideration. Few teachers are anxious to prepare all their own software and invariably turn to commercially available software. Some software dedicated to education is now emerging on the market, and all hardware manufacturers who have serious designs on the educational market are rushing to satisfy the teachers' needs.

Many teachers are curious enough about their computer system to learn the relatively easy and universally available language called BASIC. This, of course, allows the development of their own programs in the form of tests, quizzes, and CAI.

It is dangerous, if not ludicrous, to predict the future. However, if present technological trends and interest in computers continues, the following predictions regarding microcomputers are reasonably secure. Easier software--More software--Stable cost--Improved hardware --Increased utilization in the home, school, industry, recreation-- Continued technological advances.

To many educators, the microcomputer appears to be an ideal tool for teaching students about computers and technological systems. It also provides a stimulating learning environment and assists the already overburdened teacher in the promotion of a learning atmosphere.

TEACHING METHODS

AIAA W-1:00-18
ACTIVITIES FOR TEACHING TECHNOLOGY IN THE MIDDLE SCHOOL. E. Allen Bame, Assistant Professor, Industrial Arts Education, Virginia Polytechnic Institute & State University, Blacksburg, Va.

A study of middle school curriculum reveals five characteristics which can be accepted for technology curricula. The curriculum should be (1) broad and fundamental, (2) interdisciplinary, (3) horizontally integrated, (4) vertically integrated, and (5) exploratory.

From this, nine major topics for a study of technology in the middle school can be extrapolated. Learning activities can also be developed from these characteristics.

1. What is Technology? - A simple understanding of technology can be developed through the use of learning activities such as those identified by Maley (1973).

2. Processing - An understanding of the technology of locating, extracting, and processing materials such as steel making, logging and lumbering, mining, drilling, refining petroleum products are important parts of a study of processing technology. Modern environmental concerns also mandate the study of the reuse and recycling of materials.

3. Energy & Power - A study of energy and power should be organized around four concepts: sources, conversion systems, transmission systems, and uses. Student activities in this unit could include the construction of solar collectors and wind mills as representative sources of energy. The simple generator, electric motor, steam turbine, model airplane engine and lawn mower engine could be built or studied as conversion systems. Electrical transmission systems, fluid power and mechanical systems could be studied as examples of transmission systems. The home can be studied as the example of energy use and conservation.

4. Manufacturing - In a study of manufacturing the students can organize and finance a manufacturing enterprise, design a product, conduct market analysis, produce parts, assemble the product using line assembly techniques and market the product.

5. Construction - Simple surveying can be done in a study of plot layout. Masonry construction can be learned as the students pour concrete patio blocks, and lay block and brick walls. Frame constructions can be learned using a full-size wall section in the lab. Wiring and plumbing can be placed on this. Building design can be studied through the design and construction of model homes of the future, airport designs, and other commercial buildings.

6. Transportation - A study of transportation can be centered around two compatible organizing structures: the medium of travel - land, air/space and water; and the systems of the vehicle - the vehicle itself, power plants, controls, and the way. Student activities can include the theory of flight through the study of kites, unpowered gliders, powered model airplanes and U-controlled

model airplanes for study of the control systems on an airplane. Bicycle care, maintenance, use and safety can be a part of the learning about land vehicles. Conveyor systems can be studied here and integrated with the study of manufacturing and automation in other units.

7. Communication - The four major methods of producing communication can be studied: drafting, tele-communication, photography, and printing. Learning activities can include the construction of the crystal radio and one-transistor radio. Students can be organized to produce video taped programs and commercials or radio programs can be audio taped. Camera systems and techniques can be learned through construction of a pin hole camera, the making of portraits and photograms. The several printing techniques can be studied.

8. Automation - A study of automation should include the four major elements of an automated system: action components, controls, sensers and indicators, and program elements. Automated systems such as the household thermostat controlled furnace can be studied.

9. Consequences of Technology - The impact of technology can be studied through an expansion of the initial study in unit 1, "What is Technology?" A group or unit study can be revised or expanded to reflect the new learning that has taken place during the course of the study.

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AIAA. TH-9:00-1
SPECIAL INTEREST SESSION TOPIC: MASS-PRODUCED SOLAR ENERGY PRODUCTS - DESIGN TO FABRICATION. Glenn Bettis, associate professor and Charles Story, professor and acting chairman, Department of Industrial Education, East Tennessee State University, Johnson City, Tennessee.

In recent months, the study of solar energy has attracted a great deal of attention among students and educators alike. This presentation will describe the activities involved in designing, finalizing, and fabricating a mass-produced solar energy product. The level of complexity for products of this type would be at the senior high or college level. However, more basic elementary products could be designed at the junior high school level.

Design Process - The first step in the design process was to orient the students as to the basic principles of solar energy. Included in this lecture/demonstration were discussions of the basic two types of solar energy, i.e., solar electric and solar thermal. In solar electric the principles of silicon solar cells were demonstrated and discussed.

Perhaps the most popular area for the production of solar products is in the area of solar thermal energy. Products could be manufactured which apply the principles of reflecting or concentrating the sun's energy. The product described in this presentation utilized the principle of reflectivity.

Idea Development and Ideation - At first, students were assigned specific guidelines for a solar product. Each individual was required to submit an idea for a product which utilized one of the basic solar principles. Next, the class was divided into teams of five students each. Teams were encouraged to use basic ideational procedures such as manipulative verbs and brainstorming. Finally, each group was to select the most promising idea submitted for further development.

Finalization - Design Requirements - The first logical step in product finalization was to develop a set of drawings. Next, the team was required to build a three dimensional mock-up of the product. In some cases, these models were done to scale.

Another requirement was to develop an advertising brochure or a package design. Concurrently, a company logotype was developed for the company name.

PRODUCT FABRICATION

Upon completion of the design process, product selection, and development of the prototype, it was time to begin fabrication.

In order to properly plan, organize, and control production, a simulated manufacturing enterprise was established. Class members applied for and received the following positions: Production Manager, Product Engineer, Line Foreman, Safety and Security Director, Purchasing Agent, Set-up Foreman, Scheduling Manager, Sales and Finance Manager, Time and Motion Engineer, Quality Control Engineer for Components, and Quality Control Engineer for Assembly. With the entire class acting as the Board of Directors and the Instructor assuming the role of Board Chairman, a corporate name, "SOL, INC." was agreed upon. The meaning of the acronym was Solar Ovens Limited. Stock certificates were drafted and the Sales and Finance Manager was charged with the responsibility of selling the stock and managing finances.

A thorough study was made of the prototype, manufacturing sequence charted, and a flow diagram constructed. With class members assuming a third role, that of laborer, and the Production Manager directing activities, the forming, separating, and combining operations began. The instructor became a consultant and gave direction as needed.

Using engineering drawings, templates of cardboard or sheetmetal were developed. The first machine operation involved the use of squaring shears for separating the 3 x 10 foot sheets of 26 gauge galvanized steel into sizes suitable for forming or further separating. Templates, scribes and awls were then used to lay out components. Before folding single sheets of metal to form the backs, bottoms, and fronts of the ovens, a 45° angle was cut with a bench mounted hand notcher for the corners of the folds, then a pittsburgh lock forming machine was used to fold the metal along two edges for the lock. A bar folder was then used to form an "S" hem for the top edges of the fronts and backs. The sides were then marked off, notched, and folded using a box and pan brake. They were slipped into the folds for the pittsburgh lock and secured by using a setting hammer to crimp the edges at a 90° angle.

The reflectors which surround the entire oven, were made using aluminum foil adhered to reinforced cardboard with a spray adhesive. Most panels were cut to size before combining the aluminum foil and cardboard so as to reduce waste of the adhesive.

Glass was then measured, scored and broken to form the "door" of the oven. Although double strength window glass was used in this product, ideally, tempered glass should be utilized. Since the lips holding the glass in place did not form an airtight seal, sufficient heat was not generated to break the glass. Water accidentally spilled could pose a hazard, however.

Holes were then sandblasted through the glass and wooden knobs attached using wood screws in order to facilitate opening and closing the oven. The insides of the oven cases were sandblasted in order to prevent the formation of toxic fumes from the zinc coating when heat was generated.

Sheets of one inch thick duct insulation (foil covered on one side) were then cut to size and the interior of the ovens were completely lined with the material. A high temperature flat black paint coating was applied to the foil to facilitate heat absorption.

The reflectors were attached to the ovens using sheetmetal tabs as supports and taping the reflectors together at each seam with reinforced duct tape.

The finished product was then tested using a cup of water and measuring the temperature with a thermometer. On a day when the outside temperature was 44°F, the water reached a temperature of 235°F in 20 minutes.

In order to dissolve the corporation, the ovens were sold for a fair market price and the monetary assets distributed equally among the shareholders.

SUMMARY

Several benefits were derived from this venture. First, tying one class to another resulted in students gaining a better understanding of how information and activities from one course are related to information and activities in another. It is vital that students understand that all the concepts taught throughout their formal education combines to present a broad picture. Another benefit was that by using the time from two courses, a more in-depth study was allowed. Students in the second course, Sheetmetal, became dependant on results produced by students in the Design course just as personnel in one segment of the production process of industry are dependant on personnel from another segment. Students gained a better understanding of how solar energy can be used beneficially with a minimum of expenditure. Finally, tying instruction to a very real problem proved a great tool to motivate students.

*Basic idea for this product originated in Mechanix Illustrated, "Two Simple Solar Cookers", p. 44, 45, October, 1978.

AIAA. W-1:00-11

READING, INDUSTRIAL ARTS, AND THE SCHOOL LIBRARY. Roger W. Cliffe, Assistant Professor, Department of Industry and Technology, Northern Illinois University, DeKalb, Illinois.

Many reasons or causes have been cited concerning why students cannot and/or will not read. This problem is not unique to industrial arts. Low reading levels occur throughout the school. While some reading improvement has been observed nationwide over the past eight years, reading levels are still very low. It has been estimated that 5% of the seventeen year olds in affluent suburbs are illiterate. In certain inner-city areas, this rate may be as high as 20%. These figures may not shock industrial arts educators since they have frequently encountered students with low reading levels.

In industrial arts, low reading levels have affected student performance from junior high through college. Studies have found that many industrial arts text books are too difficult for student reading levels. This may explain why students cannot read, but it does not explain why students will not read.

Instruction in industrial arts is complicated when students have low reading levels. Students do not grasp or retain printed materials. This requires that instruction be demonstration oriented. Visual and verbal lessons require more time to prepare and present. The net effect is an actual reduction of instruction.

The emphasis on terminology in industrial arts textbooks compounds the problem of low reading levels. Even with appropriate illustration, students do not always understand the author's message. This lack of understanding complicates instruction in safety or safety related matters. If a student with a seventh grade reading level obtains a perfect score on a safety test with a twelfth grade reading level, has that student mastered safe operating procedures or has that student defied probability?

Students with average or above average reading levels are more likely to use the textbook to solve their problems. They are more independent which makes them more successful when using learning activity packets or programmed instruction. The independence students gain from their reading ability also enables them to generate living or coping skills considered so important in a changing society. Unfortunately, many industrial arts classes are comprised of students with low reading levels. Encouraging students to read and patronize the library are two important steps in raising a student's reading level.

The following discussion proposes some methods for improving reading skills. They are: generating motivation among students; developing a selection policy for books and periodicals; and creating an inviting library atmosphere that encourages student patronage.

Often, a teacher will suggest that his/her students cannot read. While the real problem is that students will not read books that do not interest or involve them. Appealing publications are very important to student motivation. Generally, multicolor, paperback books are more popular than hardbound books because they are easier to carry and handle. High interest topics work best for motivation. In industrial education high interest books may be task oriented, project oriented or career oriented. When the book is motivating, its reading level can be somewhat higher than student reading level; a book of this sort challenges the student.

Providing books to students as a gift or prize can also generate reading motivation. This has been proven by the Federal Inexpensive Book Distribution Program for Reading Motivation, and Reading Is Fundamental, Inc. These programs have provided children with inexpensive books of their choice without cost. Parents have been involved in distribution of the books which has helped motivate students at home. Many of the parents involved in this program purchased additional books for their children after the children displayed an interest in reading.

Making books readily accessible is second only to giving them away. An interest center in the classroom or laboratory makes books available when students are motivated. When the teacher proposes a reading assignment he/she should provide a rationale for the work. The fact that reading is communication should be emphasized. The student should feel that he/she is communicating with the author. Understanding the author's message is more important than reading speed or reading level.

One last motivational technique is that of encouraging students to write a job sheet or technical report. This report can be duplicated later and given to other students during a related lesson. If a project or technique designed by students can be developed into an article for publication, then students should be encouraged to write and submit their work. One publication will provide considerable motivation. Students may also write reviews of library books for the school paper. This practice will generate motivation while providing the student with recognition and identity.

AIAA TH: 9-10:15

LEARNING STYLES, G. Leroy Ehlers, Assistant Professor, Area of Vocational and Adult Education, University of Alabama, Tuscaloosa, Alabama.

An individuals learning style is determined by the way he takes note of his total surroundings. In order to more closely examine the process by which an individual seeks meaning from his environment, it is essential to understand some of the basic functions of the nervous system. There are two particular aspects of the nervous system that have significance to learning. "It is well known that the left hemisphere (of the brain) plays a dominant role in speech.... The right hemisphere plays a dominant role in man's perception of his environment." "The tactual and motor systems of the brain are almost completely crossed: sensations from the left half of the body and movement of the left half of the body are served primarily by the right cerebral hemisphere and vice versa. The two hemispheres are themselves interconnected by nerve pathways...which...play an important role in coordinating the activities of the hemispheres." In summary, research indicates the left hemisphere is dominant in the speech-perception system and motor activity that readily lend themselves to communication. The right hemisphere works better in analyzing the spatial relationship of objects. In order for more complete understanding on the part of the learner to take place, it is necessary for interaction between the two hemispheres to occur.

Although the development of the nervous system is central to an individual's learning style, other factors, such as family background, life experiences, and personal goals, also influence the way in which an individual seeks meaning and becomes informed about his environment. In an attempt to identify and examine some of the influences that affect learning styles, Dr. Joseph Hill developed a battery of tests and inventories. Using the Cartesian product as a basis, four sets of information were identified as a part of a person's individual learning style. These are identified and summarized in the following:

Learning Style = (Symbols) X (Cultural Determinents) X (Modalities of Inference) X (Memory & Concern)

It is important to note that although each of these sets will be identified individually they interact with each other in perceiving meaning.

The first set identifies an individual's tendency to utilize certain symbols. Two types of symbols are necessary in obtaining meaning from the environment and personal experiences. Theoretical symbols are divided into words and numbers, are either heard or seen and represent concrete objects or abstract concepts. When a theoretical symbol is confronted, the left hemisphere of the brain is responsible for the formation of the symbol. The right hemisphere, which is predominent in perception, then forms a representative image of the theoretical symbol. As an example, with the term car or automobile, a theoretical symbol which is formed in the left hemisphere, flashes an image of a favorite or familiar car in the right hemisphere. Communication begins to break down when either the theoretical symbol used does not project an image in the right hemisphere or projects an image different than was intended.

The second type of symbols in the first set are associated with the various sensory stimuli and are generally recognized as significant to Industrial Arts and other technical fields. The sensory symbols are identified by finding meaning through a sense of hearing (auditory) and being able to distinguish sounds or being able to perceive meaning through the sense of smell (olfactory) and taste (savory). Also the ability to differentiate through a sense of touch (tactile), temperature, and pain, and the ability to determine color, depth perception, and spatial relationships through sight (visual) are all qualitative symbols associated with sensory stimuli.

The third type of symbols found in the first set are programmatic in nature and deal primarily with fine and gross motor coordination. These qualitative symbols include tasks such as hand and eye coordination, left or right predominance in performing tasks, and level of muscular development.

The fourth type of symbols in the first set are associated with certain established and accepted cultural codes. These may be described in terms of a persons sensitivity toward others or the environment and the type of "values" he has developed. It may also be described in terms of his ability to exhibit deliberate behavior or role play and his ability to communicate with others through body language.

The second set is divided into three cultural influences that are brought to bear by an individual on the meanings of symbols found in the first set. These three influences or determinents are identified as: (1) individuality, (2) associates or peers and (3) family influences. For example: an individual's need to express situations in his own terms is often reflected in the "individuality" influence. The individual who understands a particular situation but expresses himself in terms of his peers is evidence of the "associates" influence. The individual who expresses a situation or problem in terms of personal relations is said to be "family" influenced.

The third set is expressed in terms of the form of reasoning or inference an individual may utilize in order to conceptualize information with which he has been confronted. A person can infer from information he is presented through: (1) a system of categorical reasoning or classifying as a basis for acceptance or rejection reflect what is termed a "magnitude" modality, (2) a tendency to reason in terms of one to one contrasts or comparisons of selected characteristics or measurements is said to be using a "difference" modality, (3) an ability to analyze a situation and discover its component parts is using a "relationship" form of inference, (4) an individual who can analyze, question, and appraise, giving equal weight to each of the previously discussed modes of reasoning is using an "appraisal" form of influence, (5) a person who uses a form of logical proof in drawing or developing conclusions is using a system of "deductive" reasoning.

A fourth set that certainly needs to be considered in the learning process, but is perhaps more difficult to measure, is the process of memory and concern. The memory function is complex and is divided into four processes: (1) recognition, (2) retention, (3) recall, and (4) association. The concern components are divided into: (1) persons, (2) processes, and (3) properties.

If the traits in each of the four sets could be identified and analyzed for each individual in any learning situation, then a system of instruction could be prescribed that would draw-on that individuals learning strengths. Conversely, if an individual's learning weaknesses could be identified then perhaps a method or system of building or strengthening these weaknesses could be devised. This would allow the individual to draw upon a greater resource in deriving meaning from his environment. By personalizing the educational environment the probable success rate for the student increases considerably.

AIAA. W-9:00-13

PAY ATTENTION!! FOLLOW DIRECTIONS!!

James F. Fales, Assistant Professor, Department of Industrial Education, Purdue University, West Lafayette, IN

How much more students can learn if they pay attention and follow directions. How much easier it is to teach when students pay attention and follow directions. Building positive character traits such as attentiveness and obedience should be as much a part of every teacher's goal as teaching subject matter and skills.

Character can be defined as an individual's pattern of behavior or personality, his/her moral constitution. Additionally, character is defined as a description of the traits or qualities of a person. The following listing provides several character traits and their definitions.

Attentiveness - showing the worth of a person by giving sincere attention to his words.

Obedience - doing my part to obey the rules and guidelines we all must follow to live together peacefully.

Contentment - realizing I can be happy with what I have or in whatever situation I find myself.

Orderliness - preparing myself and my surroundings so that I will achieve the greatest efficiency.

Patience - waiting without complaining.

Dependability - fulfilling what I consented to do, even if it means sacrifice.

Punctuality - showing esteem for other people and their time.

Alertness - anticipating the right response to that which is happening around me.

Responsibility - knowing what is expected of me and doing it.

Self Control - keeping my emotions and feelings under control so I can be free to accomplish greater things by making right decisions.

Diligence - visualizing each task as a special assignment and using all my energies to accomplish it.

Initiative - recognizing and doing what needs to be done before I am asked to do it.

Resourcefulness - wisely using things and materials that others would normally overlook or discard.

Traditionally, we teach cognitive subject matter and psychomotor skills. Can we help build positive personal qualities and attributes? As teachers we hold the key. How can we do it?

First, analyze your students. Identify the character qualities they need to develop.

Then develop a creative definition for each quality. Start with a dictionary definition, then reword that into a definition that students will understand. The above listed qualities are examples.

Next, formally introduce each quality in your class. Discuss it with the students. Why is it important? Who needs it? Give them some examples of proper and improper actions for each character quality.

Lastly, use every opportunity to reinforce informally each quality with students. Compliment students when they exhibit one of the qualities. Stress your disappointment when they choose not to exhibit character. Many opportunities will be available in class for you to stress character qualities; Here are a few shop situations that can be used for development of students character: clean-up, awareness of safety hazards, horseplay, waiting for a turn to use a machine, using sandpaper more than once. Use opportunities not only in class situations but in extracurricular activities such as sports and club activities.

One of the most important factors in helping students develop character is your example. You must show students by your example that you believe character is important. You can hardly expect them to pay attention to you if you don't pay attention to them. If you expect them to work without complaining, then you must work without complaining.

Watching students develop positive character is a gratifying experience. You will find that parents and administrators will support your efforts. But you, the teacher, are the key. Establish some goals for your students and start building positive character soon.

AIAA.

IS PROJECT ORIENTATION NECESSARY FOR BEGINNING GENERAL SHOP?

D. Patterson Fairchild, Eastwood High School, El Paso, Texas

The controversy about the use of projects in a basic General Shop has led me to experiment with other methods of teaching the use of hand tools. Like most of my colleagues in manual training, I like to try different ways of doing things in hopes of eventually coming up with a perfect solution. We all know that this is a never ending process, but it does add a dimension of challenge to a shop teacher's life. In these paragraphs I would simply like to pass on some ideas that might be worth a try.

Here in Texas our year is divided into three quarters of 12 weeks each. This lends itself well to the coverage of at least three areas of study. We have a grading period of six weeks which makes it possible to cover as many as six areas, one per grading period. Most of us move our students from one area to another, teaching only one discipline at a time rather than teaching all simultaneously.

At Eastwood High School I have one quarter of drafting, one quarter of woods and one quarter divided into six weeks of sheet metal and six weeks of electricity.

In past years I have used a box, a pencil holder and a plaque in woods; another box, a funnel and a truncated cylinder in sheet metal; an electric motor, a solenoid or magnet and a circuit board in electricity.

My misgivings started taking shape when I became frustrated with the junk being put out in woods. It seemed that the rush to take something home by the end of the 12 weeks precluded learning how to do it properly. I decided to try a quarter without a project and just concentrate on teaching "how-to". I divided the subject into 12 activities as follows:

1. General Safety
2. Saws and layout for sawing
3. Planes and squaring
4. Wood joints
5. Curves chamfers and bevels
6. Drilling and boring
7. Gluing and clamping
8. Metal fasteners
9. Sanding and preparing for finishing
10. Finishing
11. Wood, lumber and woodworking products
12. Planning a project

No time or date due was put on any of these activities, but the lessons were presented on a regular schedule. All of the instruction was completed by the end of the first 6 weeks of the 12 weeks quarter. The slow students could complete their activities easily by the end of the quarter and the fast student would have six weeks or more to build himself a project after completing the learning activities.

Five hundred board feet of inexpensive softwood was ordered for the students to turn into sawdust and shavings. The activities were presented in the following manner: after a 15 minute talk and demonstration, a quiz was handed out which could be done as homework using the text book as a reference. As soon as I checked them off on the quiz, they were given a 6" by 12" piece of board upon which to practice the particular skill they were trying to learn. When they finished the work portion of the activity, they would show it to me for comment and were either sent back to the bench for more work, or given a grade.

Each person had a printed sheet of all the experiences expected of them and the correct procedures. In this manner each student could work at his own speed and stick with it until he had done well. The project to be done by faster students was optional and any grade for it was extra. A slow student could get an A by completing the first eleven activities and by having learned the lessons well.

The idea of de-emphasizing the project produced a few very nice items, much more good learning and great piles of sawdust. The big question -- Is it more important to use good lumber to produce junk for mom to praise or turn cheap lumber into shavings and learn how to do it right for future years?

AIAA. 1979 Tu 1:00-2:30
NURTURING INVENTIVENESS WITHIN. Ann Marie Hinterberger, Industrial Arts Educator, pursuing Master's in Creative Studies at State University College at Buffalo, Buffalo, N.Y.

> "Everybody is born an inventor. As children we invent games until grown ups persuade us that our inventing is futile, that we should conform with yesterday's seemingly proven, but usually outworn invention. But inventiveness remains latent in all of us."
>
> Buckminister Fuller
> I Seem To Be A Verb

It was once believed that the ability to invent was an innate ability only of the genius. Upon investigation of this premise it is found that many inventors are found in very common walks of life. It is now known that inventiveness can be deliberately nurtured and developed. We each carry the RESPONSE-ability of promoting inventiveness within ourselves. But what is this thing called invention and what place does it serve in our educational curriculums?

Invention is the seed of a new and unique idea, conceived in the mind before materializing in the world. It is a projection into the world of present and future needs, wants, desires, and or demands. It is the unique application, improvement or ingenious combination of two or more discoveries. It is the unique ability to break familiar connections in order to produce more original ideas. The ability to invent is an attribute which has enabled the human race to adapt to the environment and raise the standard of living. Invention and discovery are keys to our continual growth and advancement as a HUMAN RACE.

Often times in education we become obsessed with learning and teaching that which has been or perhaps we investigate what is without placing much emphasis upon WHAT MIGHT BE. In order to project into the realm of the future, we must become acutely observant and curious of the present while reflecting upon the information gathered in the past. What becomes important is to encourage question and exploration of the unknown. The student must come to realize the abilities of question and exploration. These natural and essential tools assist the further development and redesign of seemingly inefficient and outworn invention. The future is yet to be. It is up to each and every one of us to play an active and positive role in its development.

There are techniques and excercises to enhance creative, inventive thinking abilities. As with any type of ability, if not properly nurtured and excercised it remains dormant and ineffective. The world is in great need of unique and effective ideas and solutions to its many challenges. The answer lies in the effective education of the people who are to deal with these situations.

"IF IT IS TO BE...IT IS UP TO ME."
ANON

Here listed are a number of references which might prove helpful in your quest of nurturing inventiveness within.

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AIAA. Tues. 9-10:30

READING TECHNICAL MATERIAL IN INDUSTRIAL ARTS.

Lillian Lemke, Education Department, Kean College of New Jersey, Union, New Jersey.

Reading is a dual process, it encompasses the skill of decoding (vocabulary) and the acquisition and evaluation of ideas (or comprehension). Words bring us the message but are useless until understanding takes place in the mind of man.

Technical termonology encountered in student texts tend to raise the readability level of assignments above the students instructional reading level. One of the techniques used to overcome this problem is the introduction of the terms students will encounter in meaningful situations prior to their reading assignments. Vocabulary development is an important skill students must master in order to function efficiently in a technical field. Words have no meaning in and of themselves. It is only when people bring prior experience and understanding to a word and the words around it that it makes sense. Contextual and structural clues aid us in clarifying the meaning intended. Dictionary use should be encouraged as students learn meanings, spellings, pronunciations, word origins, basic grammatical structure and the semantics of our language.

Authors use a variety of writing styles to add interest and to clarify their presentation. Students should be taught how to recognize and use these techniques to gain greater understanding. Paragraphs usually consist of a topic sentence followed by a number of related sentences and normally ends with a concluding statement. Sentences within paragraphs must also indicate some coherence so that ideas flow logically from one to another as they are linked together. In essence the main idea of a paragraph tells us the central thought which is then supported by the accompanying sentences, it aids us in anticipating the events discussed. Some of the specific skills students should be taught include the following:

Outlining is a useful study technique it identifies the main idea and supporting details for the reader in a clear concise form.

Comparison/contrast is the technique an author employs when he wants to point out similarities or differences in happenings, things, ideas or situations.

Cause and effect relationships are highlighted by the arrangement of supporting details. In this way the author can state the cause and then provides the results or effects or vice versa.

Examples are also used to clarify ideas. This is a simple technique by which an author arranges supporting details. The author usually gives us a clue in the topic sentence so that we are prepared to look for the examples that follow, such as illustrative stories, lists of various standards and the like.

One of the simplest methods students can be taught that aid in their comprehension is the SQ4R (Survey, Question,'Read, Recite, Rite, Review) technique. This method systematizes the students study habits. The S stands for survey during which operation the student reads the title, sub-title, captions, the first and last paragraphs of the article and studies the graphics. The student now has an overview of the article. Based on this prior knowledge the student formulates his own questions in addition to those found at the end of the chapter. The questions now provide the student with a purpose for reading. Next, come the 4 R's, Reading to get specific information, recite to verbalize the students answers to his own questions, 'Rite stands for write as the child records his answers to the questions that were raised. Then as a follow-up the child reviews his assignment by resurveying the article and then reading the questions and his responses to them.

Students should be aware of the authors intent, his reliance on inference and propaganda to make his point so that they can distinguish fact from opinion and detect fallacious arguments. When students can determine the authors purpose through the use of these study techniques comprehension of technical material will improve. Teacher guidance is of the utmost importance while the student is acquiring the forgoing skills. Students must become independent and critical readers.

In an ideal classroom three goal structures are utilized. The first or competitive goal structure exists when students perceive that they can obtain their goals if and only if the other students with whom they are linked fail to obtain their goals. This is best described as the "I am better than you" situation as students try to outdo each other, it is also the most commonly found goal structure in reading situations.

The second; individualistic goal structure exists when the students' learning goal is unrelated to the achievement of other students. An example of this could be stated as "We are all in this alone" students complete assignments on their own without any interaction with other students; evaluation is based on a criterion-referenced system so that the achievement of one student has no positive or negative effect upon the other students.

Lastly a cooperative goal structure exists when the students can obtain their goal if and only if the other students with whom they are linked obtain their goals as well. An example of this "sink or swim together" situation is where a group of students are working together to answer a set of comprehension questions, solve a problem or construct an object from written directions only.

It is important that all three goal structures be used appropriately. Cooperation is the goal structure that should be used the majority of the time and should provide the overall context for learning. Whenever it is important for students to be motivated, involved and attending, whenever it is important for students to master, retain, and apply knowledge and skills, and whenever positive student attitudes are desired, cooperation should be used. Perhaps the only limitation on the use of cooperative learning is when a task is so simple that it can be completed without the assistance of another person.

Students should compete for fun and enjoyment, win or lose, competitive drills are an effective change of pace in the classroom. Individualistically structured learning activities can be used to supplement cooperation through a division of labor in which each student learns materials or skills to be used in cooperative, problem-solving activities such as mass production projects.

In relating the three major goal structures to the area of reading in elementary industrial arts classrooms, teachers have reported that the overall comprehension level seems to be greater when groups problem solving techniques are employed. Student self-esteem was also increased as each student became a productive member of the group. Student to student interaction, carried over into other subject matter areas, where increased reading comprehension was also noted.

AIAA SPECIAL INTEREST SESSION. T-10:45-9
DEVELOPMENT OF WORK ATTITUDES AND WORK HABITS IN INDUSTRIAL ARTS EDUCATION. Cheng C. Liu Associate Professor Department of Industrial Arts and Technology state University College at Oswego, Oswego New York.

Work as used in this paper is defined as an activity in which people usually engage for pay that is central to personal development and total life adjustment and that is a situation for satisfying needs. There is growing awareness among educators and researchers that the affective dimensions of human development must be given more adequate emphasis in education. Educational programs have traditionally concentrated on the development of cognitive skills and have not adequately emphasized development of the student as a 'whole' person. Increasingly students are being recognized as having broad spectrums of developmental needs including both cognitive and affective needs. In spite of a lack of general agreement on the definition of affect. affect is viewed as a very important and complex part of human and vocational development that must be understood if education is to be effective education.

There are two especially important reasons for increasing educational emphasis on the total person. First there is the recognition that affect and cognition are closely related in the classroom. Some experts even argue that affect and recognition are practically inseparable. As a result educators now advocate a broader set of educational objectives. Second job performance has often been found to be a function of certain affective skills and attributes such as ability to work in close cooperation with others and attitude toward the work performed.

A self-report procedure --word association technique was used in the study (Essex and Liu. 1974) to determine the nature of affect associated with the work environment. The work related concepts list was developed by using the following criteria: 1) it be work related and 2) it be representative of an empirically-based work factors or work category related to work attitudes. This list may be used in the classroom or laboratory teaching situation (Liu. 1976) for the following purposes: 1) to orient participants to empirically derived work related concepts 2) to increase the participants'awareness of work environments. 3) to provide an opportunity for the participants to evaluate their feelings and perception about work and to share these feelings with others and 4) to provide attitudinal information for curricular and instructional development.

FOOTNOTES:

Essex D. W. and Liu. C.C. A Methodology to assess the Content and Structure of Affective and Descriptive Meanings Associated With a Work Environment. Columbus Ohio: The Center for Vocational Education. The Ohio State University. December. 1974.

Liu C. C. 'Work-Related Concepts: Increasing Personal Awareness,' in Affective Education Strategies for Experiential Learning. Louis Thayer (editor). LaJolla CA: University Associates Publishers. 1976.

Job Content	General Need Satisfaction	Compensation	Working Conditions	Supervision	Company and Union	Co-Workers
Assignment and perceived complexity of tasks My opportunities to do a variety of tasks Opportunities to do challenging work My job *Control of work methods and work pace* My control over work methods My control over work pace Interference with my job *Skills and abilities of worker* Use of my abilities at work My competence at work Opportunities for on-the-job training	*Security* My job security *Social* Interaction with my co-workers Opportunities to help others in the community Me at work *Esteem* Moral "rightness" of my job Recognition of my work My prestige at work Prestige of my job in the community *Autonomy* Freedom to use my own judgment at work My self-confidence at work *Self-actualization* Opportunities for self-fulfillment Feeling of accomplishment at work Daydreaming at work	My pay My opportunities for promotion My fringe benefits	My working conditions The work methods used on my job The work pace used on my job My working hours The equipment used on my job Overtime work Coffee breaks	My supervisor My supervisor's ability to handle people Interaction with my supervisor Supervisor's evaluation of my work	Company policies of my job Handling of grievances on my job The union on my job	My fellow co-workers

AIAA. Wed.-3:00-1
INDUSTRIAL SIMULATION. John N. Riley, associate professor, Department of Industrial Education, Iowa State University, Ames, Iowa.

Industrial Arts means a lot of things to a lot of different people. Just what is it and how can it best be presented to meet the needs of youth in the technological society of today?

Essentially, Industrial Arts should interpret the goods and services of industry in the most accurate and interesting way possible. This should be done in such a way so as to relate to all ages and grade levels of Industrial Arts students.

Of all the ideas and techniques in use in Industrial Arts class rooms today, it is this speakers opinion that the Industrial Simulation Enterprize technique will go the farthest in reaching the goal of teaching an understanding of the total technological cycle. In addition, the technique is second to none in creating practical problems which must be solved by individual and group effort.

If the Industrial Simulation Enterprize technique has such value, just what is it and how do I as an instructor implement it? Essentially it is the process of conceiving a product, designing it, manufacturing it, selling it and possibly servicing it. All in all, the Industrial Simulation Enterprize technique is a great way to tie the whole technological picture together.

Before starting one should recognize some basic factors. (a) It takes more effort and coordination than traditional industrial arts methods. (b) It involves the management of student personalities in a group as well as in individual situations. (c) It may involve the added responsibility of working with outside capital resources. (d) It involves the possibility of failure as well as success on a group as well as an individual basis. Nether the less, it is one of the most rewarding for the instructor and students and it also has far reaching public relations potential. Thus convinced, how does one start?

A possibility is getting a reference text. Two good ones are Manufacturing by Wright and Jensen and Manufacturing in the School Shop by Haws and Schaefer. Most important is the preparation of an outline to insure that all points will be covered.

Brainstorming product ideas is one of the most motivating ways to start. From this there quickly develops many needs to be met and problems to be solved.

One of the nice fringe benefits of this technique is that there is no materials cost for the school. Materials are all purchased with funds generated by the sale of stock. This is always a fun time, especially at the close of the company as the profits are divided up in the form of dividends.

Once the product is narrowed down; final design, manufacturing and production engineering must be planned for. In all of the production use jigs, fixtures and any other means to insure good fit for inter-changeable parts. If this is not finely tuned, it will create some real bottlenecks at assembly time.

Much more can be said, but in reality a well designed and manufactured product is the key to a successful experience. You are to be encouraged to really push quality control and emphasize that any one of the products may become their own property. Emphasize this, as well as push for equal to "downtown" quality and you can be assured of a highly motivated and excited group of learners, who in turn are gaining an insight into the complexities of the process of producing goods and services.

(This presentation was complimented by slides, products and magazine reprints.)

TECHNOLOGY

Appropriate Technology : A New Approach to Development

by : Aminur R. Chowdhury
Program For the Study Of Technology
West Virginia University, Morgantown, West Virginia.

* Paper presented at the American Industrial Arts Association Conference, February 28, 1979 at San Antonio, Texas.

> *"We are confronted by the worldwide collapse of Population, Agriculture, Industry, Wildlife, and Natural Resources. This collapse has already begun. It can be expected to reach catastropic productions during the next few degrees . . . .*
>
> *To meet this challange we need a new technological order. A new development approach, and an emphasis upon global interdependence"*
>
> World Conference on Alternative to Growth, 1977.

We are passing through a critical phase of our ecological stability. The complex network of the current technological system and the total dependence of our lives on the mighty power of technology have forced our destiny towards an uncertain future. Herman Kahn, B. Bruce-Briggs and other futurologists say change is now happening at an exponential rate. This means that by the time we spot a social trend or problem, it is almost too late to react. Alvin Toffler's " Future Shock " is no longer to be anticipated as it co-exists with us today.

The search for answers to many global problems like : accelarating industrialization, rapid population growth, wide-spread food shortages and malnutrition, depletion of natural resources and the deteriorating environment (Meadows, 1973, p.1) is creating a new pressure for change. A change which will promote ecological stability, human development, socio-economic improvement and technological balance.

There is thus a pressing need to identify new and more realistic approaches to the problems of balanced development, taking into account the fact that technological-economic growth and social progress are not mutually interdependent, but also organically related parts of a single process of development. This emerging unified Socio- Techno-economic development concept makes it possible for the overall development to be aimed more precisely at meeting the most urgent critical needs of the both developed and developing countries through a deeper understanding of the fundamental human problems, needs and priorities.

This new approach follows the principles that planning for social development involves much more than the elaboration of development plans for education, health, housing and other social sectors. To be fully effective it requires that the economic considerations and technological choices should be appropriate and/or deliberately designed to serve the purposes of enhancing human welfare, and promoting desirable changes in institutions (and creating new one's if necessary) and social structures, simultaneously with their more obvious material objectives.

In recent years (approximately since 1970) a new movement in Appropriate Technology is vigorously challanging the conventional technology and procedures for economic development. The movements call for a drastic revision of present technological system seems inevitable if present global problems are to solved.

The concept of " development " which in turn contributes to the creation of a sustainable society is best addressed by Appropriate Technology in the following manner :

1. Appropriate Technology provides a cultural re-definition of human development and de-emphasizes the intrinsic value of material consumption and emphasizes the growth in non-material dimensions.
2. Appropriate Technology emphasizes quality of human life and minimum standard of living to all.
3. Appropriate Technology leads the region and the local community to a greator self-relient, self-sufficient economy.
4. Appropriate Technology fosters efficiency in material and energy resource consumption.
5. Appropriate Technology promotes regional development and decentralized economy, this in turn reduces rural-urban population migration and provides incentive to a balanced socio-economic growth.
6. Appropriate Technology is environmentally sound and is compatible to the eco-system.
7. Appropriate Technology provides technological choice and technological alternatives to the people.

The technological revolution of our time, and the current outcomes of the " Appropriate Technology movement " can be referred to as " information society " (that is, a society largely availing itself of advanced information and communication technologies), which has given our generation the sense of belonging to a unifying world society. We are acquiring the sensation that we are approaching the limits to growth and the finiteness of our planet. Appropriate Technology looks into the foreseable exhaustion of non-renewable natural resources, the deterioration of our environment, the risk of climatic alterations, i.e., all processes that could seriously affect the well-being, and even the survival of our society. The image of " Appropriate Technology movement " is representing in a dramatic but realistic way the situation and prospects of today's human society.

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AIAA W-9:00-9

Biotechnology & Industrial Arts
Program for the Study of Technology
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Paul W. DeVore, Professor
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Biotechnology is the study of the symbiotic relationship of tools, machines, materials, techniques and technical systems to human beings and other living organisms.

Industrial arts education is one of the few subjects studied in the public schools which can make a major contribution to the understanding of these critical relationships and the improvement of the quality of life through the proper selection and design of technical means.

Technical Means and Human Development

There has always been a concern about the impact new technical means have had on people, their culture and the environment. In the last several decades this concern has become a worldwide cultural revolution. It is called the appropriate technology movement. Its primary concern is the relationship betwen the quality of human life, the environment, and technical means. Those involved in the AT movement are well aware that any human society of any quality must have a well designed and efficient technological base. To conclude otherwise would be wishful thinking.

The appropriate technology movement originated from a new awareness that the continual expansion of technical means based on 19th and 20th century assumptions could lead to disaster. Among the factors which caused alarm were the development of an increasingly severe energy shortage with few adequate solutions; a world food problem affected directl[illegible] energy shortages; population increases; the continual loss of arab[illegible]nd through destructive agricultural and resource management [illegible]ces; the increasing deterioration of the earth's biological syste[illegible]d the realization that life on earth depends and will continu[illegible]epend primarily on renewable resources.

Value Orientation

Concern for the security of the future and the preservation of a human oriented society brought about the realization that the present was not contemplated or planned but entered into on faith - faith that more was better, bigger was better and that the megamachine was the way to the good life for all people. Faith in large-scale sophisticated and centralized technical systems, as the only solutions to human problems or the only means to improving the quality of human life, came under renewed atack. People began to wonder if many of the problems of the world had not come about because of the design of the technical system; that perhaps faith in the megamachine evidenced an impoverished social ethic and an ignorance of the role of technology in social purpose.

The appropriate technology movement has questioned whether there might not be alternative forms of technical means that would be more appropriate to human needs and social purpose. The focus which has evolved has been one that places the creation and development of technical means in the spotlight of the public forum where not only the concern is about what can be done, but also what ought to be done. Such a perspective is the basis of a new ethic; an ethic committed to the design and creation of a future which provides a life of dignity and well-being for all people and future generations as well.

A New Ethic

The new ethic has emerged from new information and knowledge and a new awareness by more and more people of how complex and interrelated the natural world is. The new ethic came about also from the realization that the earth is not large enough, and the resources plentiful enough, to tolerate in any long term future the escalation of the current egocentric and aggressive technical behavior on the part of its inhabitants.

The new ethic includes four sub-ethics.

- The Humanistic Ethic - directs individual and group actions toward the enhancement of human development and personal growth, not the technical enterprise.
- The Ecological Ethic - recognizes the critical relationship between the quality of human life and the natural environment.
- The Global Ethic - directs attention to the understanding of human beings, social systems, technical systems, ecological systems and the environment as all part of one integrated symbiotic system.
- The Enabling Ethic - founded on the emergence of the realization that technological systems can be designed and controlled for human purposes and that the design and development of appropriate technical means will enable human beings to create a more humane future.

The appropriate technology movement is a visible manifestation that a significant social transformation is taking place. During the 1960's and 1970's value shifts occurred. More emphasis was placed on the humanistic, the spiritual, the quality of life and community, and a concomitant decrease in emphasis on materialistic values, status goals and undifferentiated economic growth. There were shifts in values from quantity to quality, from merely "more" to "better," from independence of nations to interdependence, from exploitation of nature to living in harmony with nature and from priority of technical efficiency to technical efficiency with ecological justice.

Stewardship

The quality of human life in the future will be determined by the creative spiritual power latent in every human being; from an understanding of the interrelationships of social, technological and ecological systems; and by the wisdom of choices made by each and every person as part of a collective human action.

The industrial arts profession can contribute to a better future for all people by focusing on the study of biotechnology - the relationship of technical means to human beings and other living organisms.

International Relations Special Session W 1:30 - 4
APPROPRIATE TECHNOLOGY IN ENERGY AND HOUSING; CONTENT OF WVU'S OWNER-BUILT HOUSING WORKSHOP. Louis K. Hans, Training Associate, Technology Education Program, West Virginia University, Morgantown, West Virginia.

The Owner-built Housing Workshop is based upon the need for appropriate uses of technology. Shelter is one of our most important basic needs and is a critical consideration in the lives of most people. A discussion of appropriate technology as it applies to shelter should begin not with "how to" but rather a discussion of "why". It is essential that the basic philosophical foundations be laid before beginning substantive clarification of construction procedures. This paper will deal with philosophical determinants and will be followed by a paper aimed at the workshop content and classroom application.

Shelter is defined as that which covers or defends; a protection or place of protection; or a refuge. Our current method of providing shelter, at least in the Western World, seems to have strayed from this definition. Housing is no longer just a refuge but instead there is increased emphasis upon status and esthetics. Appropriateness, especially in energy and raw materials, has not been given much thought.

Originally shelter was adapted to the environment and to indigenous materials. Unfortunately, more efficient production systems and artificially cheap energy moved us away from these appropriate methods.

It would seem that we have several alternatives:

1. Continue to buy pre-built housing that is of poor quality and expensive.
2. Owner-involved, contractor-built housing.
3. Owner-designed, owner-built housing.
4. Renovation or retrofit of existing houses.
5. Systems approach, mass production.

The criteria for determining the appropriateness of a shelter are as follows:

1. Meets the needs of the people who occupy it and is designed with them in mind.
2. Uses indigenous and salvaged materials as much as possible.
3. Design should be energy efficient and well insulated.
4. Should be able to provide basic comfort levels even during power failure, gas shortage, cold weather,etc.
5. Water conserving plumbing system.
6. Should be owner participatory and ideally involve others in the community on a reciprocal basis.
7. A shelter should exist in harmony with nature and its surroundings.

Concern for the appropriateness of shelter and for the environment greatly influenced the decision to begin the Owner-built Housing Workshop at West Virginia University. The Workshop was started in the fall of 1978 by Karl Hans, John Manchester, and Mike Vogel, graduate students in the Technology Education Program. The Workshop purpose is:

1. To demystify the construction process and increase student awareness of design and construction of low-

cost, energy-efficient, passive solar homes.

2. To acquaint the student with alternatives to current housing technologies.
3. Assist the individual in becoming more self-reliant.
4. To foster the ideals of energy conservation and environmental protection.

The Workshop revolves around several basic philosophical and practical ideas. They are:

1. Our current consumption of natural resources and energy is linear - they are steadily increasing. We should consider alternatives.
2. Build a house that can sustain itself without outside utilities for a reasonable period of time.
3. Build a house you can be unemployed in.
4. Look at materials on a cost curve. Are there alternatives?
5. Analyze the "why" of building. Get your head together.
6. Don't get hung up on petty decision making and overlook long term goals.
7. The nature of responsibility has changed. Be prepared to fix anything you put into a house.
8. When designing consider personal philosophy and lifestyle.
9. Avoid being caught up in specialization. Do as much as you can yourself.
10. Define what a low-cost, energy-efficient, passive solar house is. Low-cost means economical to build and keep up but not cheap. Energy-efficient conserves in day to day operation and in the amount of energy required to produce the materials. A passive solar house is designed with four principles in mind:
    a. Admit maximum winter light through south-facing window wall.
    b. Lose minimal heat through all other surfaces.
    c. Trap gained heat with nighttime insulating devices over window wall.
    d. Prevent excessive summer heat gain with roof overhang.

In other words the house itself becomes a large solar collector.

The Owner-built Housing Workshop has been effective and very popular. It is controversial and does challenge many of the ideas and principles inherent to construction today. It was intended this way. It is not difficult to teach a basic construction course by using textbooks and materials available commercially. The difficulty and the challenge is to teach a course that goes beyond plywood, nails, shingles, and studs. We believe we are doing just that.

ACESIA TU.1:00-2:30

TECHNOLOGY FOR CHILDREN-Current Implementation

Wesley Perusek, Associate Director, Technology for Children Program, New Jersey Department of Education, Trenton, New Jersey

Technology is indeed for Children. Think about it. If not for children, then who? Children are in elementary classrooms-regular elementary classrooms-all over the nation. It is in these classrooms that lives are unfolding and it is in them with their hard working, often heroic teachers, that technology may make its greatest impact. The teacher is the crucial agent. In order to do the best for the children, the teacher needs a support system or structure that is truly supportive. Such a structure is responsive and pertinent. Most importantly, the support is readily at hand-direct, to the point and applicable, in a word-relevant.

Technology for Children (T4C), in its 13th year of operation, currently involves some 6,200 teachers in all counties in New Jersey. The program movement is toward creating and extending more learning options for children based upon comprehensive first-hand experiences and encouraging self-direction, curriculum developed from the environment and experiences of children and cooperative program development. T4C extends a variety of services to schools which are explained in T4C publications available on request.

Its broad goals over time for gifted/talented, regular, disadvantaged and handicapped children have been to help each child:

- Improve and increase self-awareness
- Enhance a more meaningful attainment in the academic skills
- Develop a better understanding of technology and the world of work

Since 1975, public schools and the New Jersey State Department of Education have worked under the New Jersey Public School Education Act of 1975. The Act provides a comprehensive planning model from goal development to program selection and implementation, budgeting and evaluation to provide every child a thorough and efficient public education. Technology for Children is accepted as one program helping schools achieve the mandates of the Act. Individual school districts further refine the broad Technology for Children goals based upon their own needs assessment, goals and objectives and program selection.

T4C school implementation is in regular elementary classrooms with the classroom teacher the key and agent. Ideas, activities, material selection and topic areas and involvement broadly develop from the district, school and teacher's own goals. Implementation is integrated and often develops thematically. Idea generation and sharing with other districts and teachers is encouraged.

Districts apply for available state funding on a matching basis as start up or seed money to involve at least four teachers and a coordinator/leader-usually the building principal. Schools also begin on their own, adding the program and entering the teacher preparation process and participating in program functions.

The preparation sequence begins with a 15-18 hour orientation. During the fall, 1978, 28 T4C leaders conducted orientations for 400 funded teachers. This annual group then has available, three graduate inservice T4C college courses offered in conjunction with Jersey City, William Paterson, Trenton State and Glassboro State Colleges and conducted by college staff and T4C supervisors.

Throughout the year, the T4C Teacher Center in Edison offers an environment for learning, leadership and special topic workshops, college courses and visitation tours and browse areas of ideas, materials and resources. Visitors are welcome and have come from throughout the state, Eastern U.S. as well as several foreign countries. Special topic workshops this year included: Problem Solving, Energy Education, Microcomputers and Invention and Inventors with classroom support for each.

Support and sharing continue with an eight region statewide structure with regional leaders holding two meeting/workshops per year. Regional leaders meet with the state program staff four or five times each year to help plan, advise and assist in program development as the T4C Advisory. A T4C teacher affiliate group with the New Jersey Education Association developed as another means of further sharing and exchange.

In 1975, on recommendation of its Advisory, the program moved to sponsor the Unified Sciences and Mathematics for Elementary Schools (USMES) program. USMES centers its effort on helping children become better problem solvers through interdisciplinary challenges-problems children deal with directly. Two T4C-USMES Resource Teams work to inform and assist interested local districts in this process approach.

Finally, T4C teachers, schools and interested others come together each Spring to share their work and explore new areas in the Annual T4C Spring Conference. The Conference is Statewide.

Parental support and involvement wherever possible is a natural where children are involved in less formal projects, activities and experiences. Classrooms where parents can feel they are contributing and teachers can accommodate this help take on expanded dimensions of influence in the lives of children. Such cooperation is widely practiced in T4C schools.

In summary, technology is for every child. The classroom teacher is the crucial agent. A support system and process for the teacher is essential. T4C teachers have a regular sequence of preparation over time and an ongoing, developmental support system working in harmony to the benefit of every child in participating schools in New Jersey.

FOOTNOTE:

For further information or assistance in program development contact the T4C Teacher Center, N.J.J.C.C., Plainfield Avenue, Edison, New Jersey, 08817, (201) 985-1533.

AIAA Interest Session W - 3:00 - 4:30 p.m.

The Development of People Oriented Technology

Charles A. Pinder, Associate Professor, Industrial Arts Education, Virginia Polytechnic Institute and State University, Blacksburg, Virginia.

Industrial Arts is concerned with the development of people, society and technological systems. This interrelationship must be clearly understood and put into practice by all industrial arts professionals if we are to create the kind of education needed for a technological society in the 21st century. According to Barnet (p. 163), "a crucial resource of any society is its capacity to develop the right kind of technology for its own need."

For the past ten years, we have been involved in three disenchantment movements. They are: (1) the environmental movement, (2) the technology assessment movement, and (3) the appropriate technology movement. All of these movements relate to the impact technology has on people and the bio-physical environment.

In order that technology can be developed in the best interest of people it must meet the following requirements:

- It must improve our quality of life.
- It must elminate need for continued use of fossil fuels and further extraction of non-renewable materials.
- It must reconnect us with the rewards of meaningful interaction with other people.
- It must convert work into a meaningful and rewarding process.
- It must convert our institutional structure to sustainable forms.
- It must help us realign our action with our basic values. (Editors of Rain, p. 2)

We must begin also to move toward "reverse engineering" (Barnet, p. 171). Reverse engineering is defined here as the process of converting capital - intensive technology into more people oriented technology. This process may consist of the following six steps:

(1) Problem Inquiry - Determining Basic Need
(2) Specifying Goals - Determining Specific Constraints
(3) Determining Means - Proposed Best Solution
(4) Solution Optimization - Optical Proposed Solution
(5) Construction and Verification - Workable Proven Solution
(6) Convince Others - Useful Creative Contribution to Society (Bailey, p. 69)

The development of people oriented technology is a challenge. People cannot select and assess options which they do not perceive. "The world of the future will have to be characterized by technological diversity if it is to be socially and ecologically sustainable" (Norman, p. 39). To be sure, industrial arts can and should assist in the process of removing barriers to the development and introduction of technologies keyed to the needs of people living in a given environment.

Footnotes

1. Bailey, Robert L. Disciplined Creativity For Engineers. Ann Arbor Science Publishers, Inc., Ann Arbor Michigan, 1978.

2. Barnet, Richard J. and Miller, Ronald E. Global Reach - The Power of the Multinational Corporation. Simon and Schuster, New York, 1974.

3. Editors of Rain. Rainbook:Resources for Appropriate Technology. Schocken Books, New York, 1977.

4. Norman, Colin. Soft Technologies, Hard Choices. Worldwatch Paper 21. World Watch Institute, June, 1978

AIAA, W-9:00-10:15

APPROPRIATE TECHNOLOGY FOR EMERGING COUNTRIES

Ronald Todd, Chairperson, Department of Technology and Industrial Education, New York University, New York, New York.
Ray Shackelford, Assistant Professor, Department of Industrial Education, Ball State University, Muncie, Indiana.

Introduction: During the initial development of the appropriate technology project, A Pilot Study of the Useability of the FLEX System in Schools and Industries in Columbia, South America,[1] five key assumptions were made. They were:

1. Appropriate technology must be flexible and responsive to match the growth of the individuals and agencies involved.
2. Any country, agency, or individual will require different levels of technology.
3. Appropriate technology is not necessarily low-level or anti-technology.
4. Transfer of technology from one culture to another is not a simple matter.
5. Impact studies of proposed projects are extremely difficult to conduct, but necessary.

Phase I: The initial feasibility field study requested by the United Nations was designed to determine the potential of the FLEX System[2] to support the transfer of low- and mid-range technology related to specific production needs of small and/or rural industries in Columbia. It was felt that through the use of the FLEX System, a technologically naive group of workers could be helped to improve production in a sequence of small and easily understood steps. Although increased productivity and product quality were the immediate goals, several other potential goals were identified. They include: increased exports, regional development, redistribution of wealth, improved cash flow, economic independence, etc.

During the initial planning stages of Phase I, it was determined that the field study team would conduct an on-site needs assessment using the Discrepancy Model, shown in Figure 1.

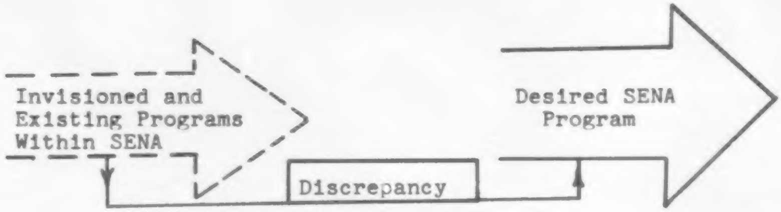

Figure 1
Discrepancy Model for Determining
Appropriate Technology Needs

The gathering of information for the needs assessment took place during the visitation phase of the feasibility study. The following tasks were performed during this phase: (1) the proposed school and industrial sites were visited (although the Columbians were reluctant to show their smaller, less sophisticated industries), (2) the sites were analyzed and documented, and (3) United Nations, Columbian (SENA)[3] and United States participants met to discuss problems and possibilities of the project. With the new information from the needs assessment, the field study team was better prepared to match the appropriate technology goals with the needs and objectives of SENA.

A modification of the original proposed project emerged from the cooperative effort of the program participants. Specifically, the task before the FLEX team was to integrate the six needs and six activities presented in the initial feasibility study into one project. This project was to reflect the priorities that grew out of the cooperative planning. The new priorities that were established included:

1. Design and develop an interim facility for the training of individuals in manufacturing related to appropriate technology.
2. Train instructors to work in the facility to prepare individuals as appropriate technology specialists.
3. Design and develop a mobile system for delivering appropriate technology assistance to small and primitive industries.
4. Determine the most productive strategies and forms of instructional and learning materials that are suited to the FLEX System, the appropriate technology mission, and the Columbian student.

Based on the initial feasibility study, the discussions between SENA personnel and the FLEX team, it was determined that the FLEX System indeed had a high potential for useability in schools and industries in Columbia. The general agreement of SENA personnel and the FLEX team was that the work on Phase II should start immediately.

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[1] Project centered at New York University, funded by the United Nations.

[2] The FLEX Equipment System is used much like a sophisticated erector set ©. The components of the system can be assembled, disassembled, and reassembled again and again to build a wide variety of machines and support equipment that meet the needs of the specific population or production problem.

[3] SENA (National Apprenticeship Services) the national Columbian agency in charge of industrial development and training.

AIAA. W-1:00-9

IMPACTS OF TECHNOLOGY, Lee Smalley, Industrial Teacher Education Dept, University of Wisconsin-Stout, Menomonie, WI. Marie Abbey, Industrial Education and Technology Dept., Montclair State College, Upper Montclair, N.J.

What exactly is technology? In the broad perspective, it is society's knowledge of man at work, creating and expressing himself. Technology encompasses the manner in which man makes or does things. Man is responsible for the very fiber of his environment - be it on earth or in space. His culture, values, and mores are fashioned by the impact of his technological developments.

From the age of cave men until the period of machine production, man was confronted with the problem that the production of food and manufacture of goods was insufficient for his needs. Throughout history few men have been able to escape an existence without hunger, intellectual poverty, and shelter that was lacking in some form or another.

The Industrial Revolution of the last half of the 19th century provided us with more than a mushrooming of factories and machines. In a short span of time, it completely changed the complexion of our society. The nation of small property owners, most of whom were independent farmers changed to a nation where men were now employed by other men. Our nation, which had been primarily agrarian, was becoming an industrialized country. The migration from the farm to work in the busy humming factories, forced men to live in ever-growing, expanding, and crowded, noisy cities. Technology and invention encompassed a new purpose. It served as a means to social mobility. The desire of creative and innovative people was to acquire fame and fortune by developing an invention.

As one moves away from the communications revolution and steam engine technology of the 19th century to the innovations of the 20th century, it become apparent that there are many side effects which have resulted from man's advances. These exciting, new ideas and innovations, which seem so appealing on the surface, have enormous ramifications. The adversity of these consequences, are frequently not realized until they are irreversible. We must learn to adapt technology to our needs. It should be used as an extension of man's abilities to accomplish those things man cannot do for himself. We can see how the environment has been altered both positively and negatively by the proliferation of skyscrapers and the diversion of waterways for our own benefit.

Technology cannot be permitted to run rampant, forcing people to retreat from society. In our nation, regulation can only result from educating the masses to comprehend the nature, capabilities, limitations, and ramifications of technology. Perhaps it is time for the industrial arts teacher to assume this responsibility.

A two credit graduate course called Impacts of Technology has been developed and taught at the University of Wisconsin-Stout for the last eight years. There has been a variety of students taking the class, and since this is generally a new area of study for them, progress is usually quite rapid.

There is an abundance of reference material for use in the class. It is in newspapers, magazines, scholarly reports, government documents, films, and in people's own experiences. These materials, ideas, and concepts need to be articulated, then internalized by students so that an attitude toward technology can be translated into decisions which affect all of us. There is no problem with class discussion.

Assignments:

(1) Viewing and discussing films - Glass, 00173, Medium Is the Massage, American Enterprise: Innovation, Plow That Broke The Plains, Have I Told You Lately That I Love You?, Strip Mining, Limits To Growth, and Pegasis.
(2) An ancient invention - Development and implications
(3) Exercises in text - Complete two at the end of selected chapters
(4) Pass it on - Develop material for a specific audience
(5) Case studies - Write up case studies of the impact of a technological development in both the present and future time frame.
(6) Book Review - Review the author's point of view, what is not said, and your reaction to it.

Evaluation of these assignments are either OK or Do Over. Six OK's will be a B, five will be an incomplete, an extra assignment for seven OK's will be an A.

Resources:

Textbooks are:
Dorf, Richard, Technology, Society and Man. Boyd and Fraser Pub., 1974.
Lawless, Edward, Technology and Social Shock, Rutgers U. Press, 1977.

Magazines used are:
"Impact of Science on Society," UNESCO.
"Technology and Culture," Society for the History of Technology.
"Technology Review," M.I.T.

Reports from:
Harvard University, Program on Technology and Society.
Office of Technology Assessment, Congress of the U.S.
Dialogue on Technology, Gould, Inc.

Selected Books:
Schumacher, E.F., Small is Beautiful, Harper & Row, 1973.
Gray, Elizabeth and others, Growth and Its Implications for the Future, Dinosaur Press, 1975.
Heilbroner, Robert, An Inquiry Into the Human Prospect, W.W. Norton, 1975.
Pytlik, Lauda, Johnson, Technology, Change and Society, David Pub., 1978.

International Relations Special Session W 2:30 - 2

APPROPRIATE TECHNOLOGY IN ENERGY AND HOUSING: CLASSROOM STRATEGIES AND APPLICATIONS OF THE OWNER-BUILT HOUSING WORKSHOPS. Michael Vogel, training associate, Technology Education Program, West Virginia University, Morgantown, West Virginia.

Shelter and energy are needs which humankind cannot live without. They are also the major concerns of the Owner-built Housing Workshops (OBHW) conducted through the Technology Education Program at West Virginia University. Shelter provides us with a controlled environment for protection from natural elements--energy is the mainstream of all existence. Today more than ever before these needs are of great concern.

The Housing Concern. Housing is the single most large investment a consumer will make in a lifetime. Almost all the costs for housing are higher today than they've ever been before. The costs for land, for materials, for the labor to build the house, and for the energy we use to maintain it have all doubled in only a few years. In former times building design was closely related to the surrounding environment thus reducing the cost of construction. In more recent time, we have moved far from this practice, utilizing new technologies and cheap, abundant energy. Energy and building materials come from far off places. The consequences of all this are that conventional modern homes are high consumers of energy, water and other resources, high producers of waste products, and have very heavy impacts on local and distant environments.

The Energy Concern. Energy is an integral part of housing and also of great concern. One of the characteristics of modern civilization is the increasing rate of energy utilization on a per capita basis. In the residential sector the increasing rate of energy utilization per capita is due primarily to the increasing demand for year-round climate control and for energy-consuming systems (minor and major appliances). Lack of understanding energy conscious design and poor construction techniques also have increased the energy usage in the residential sector. The consumption of energy by the residential sector represents approximately 20 percent of our national energy budget.

The Owner-built Housing Workshops (OBHW). The OBHW's at WVU are involved with environmentally appropriate housing. Specifically, the objectives of the OBHW's are: 1) increase student awareness of housing design and construction process, 2) provide an understanding of alternatives to current housing technologies, 3) enhance the students ability to design and build a house, and 4) acquaint the students with references and resources for the design and construction of low-cost, energy-efficient housing.

These objectives are accomplished through two workshops--the "basic" workshop and the design workshop. Both workshops meet for three hours one night a week for 15 weeks in adjacent classrooms.

The Basic Workshop. The target group for the basic workshop is the general public, but specifically those that are interested in building their own homes. This workshop has been conducted for two semesters, both with capacity enrollments--37 and 53 students respectively.

Topics for the basic workshop include framing, foundations, siting, climate, electrical, plumbing, calculation of force and moments, material sizing, heat loss, insulation, etc. See Table for workshop content. Due to the size of the class, limited space and no laboratory facility the method of instruction is recitation conducted by three instructors.

The book, From The Ground Up, by John Cole and Charles Wing is used as a text for the basic workshop.

The Design Workshop. The design workshop is open to only those whom have completed the basic workshop. Due to the nature of this workshop a drafting facility is being utilized which limits the enrollment to 13 students.

The purpose of the design workshop is to provide students competencies in architecture design and drafting through the application of the basic housing workshop.

At the outcome of the workshop it is hoped that students will have a complete set of house plans with calculations relating to it.

Future Workshop. The possibility of a Construction Workshop is in the planning stages for the summer of 1979. It is the hopes of the OBHW staff to build a OBHW designed shelter with the aid of students enrolled in past workshops.

Application of OBHW to Industrial Arts Education. From the standpoint of I.A. education the OBHW approach is ideal subject matter. The course provides students with both the theoretical and practical knowledge of housing problems design and construction. Thus it is applicable to both lecture and laboratory teaching situations and requires no equipment other than what is found in a general I.A. lab set-up. Such knowledge helps prepare students for critical decisions in the future relating not only to housing but to energy, the environment, self-reliance and other problem-solving situations associated with our technological, sophisticated world.

The OBHW content has a very unique application to I.A. The housing content need not be confined to a wood, construction, or architectural course. This content leans itself to the total I.A. program, whatever the present program set-up. The object of such a course is not to take over other subject-matter but to apply the content to all areas of the program. It is not even necessary that the content be a course in itself, however, for continuity and simplicity a separate course is recommended.

Following is a condensed, suggested listing of the OBHW content as is related to I.A. areas. This listing can be modified to local I.A. programs on either the secondary or post-secondary level or expanded to include other topics related to the housing problems.

OBHW Content	*Related I.A. Areas
-The Housing & Energy Problem	5,10,11,12,13
-Framing and Foundation Types & Systems	12,13
-Space Analysis	1,3,12,13
-Climate and Siting	1,2,3,5
-Site Services (roads, water, power, etc.)	2,4,5,11,13
-Forces & Moments, Loads, Deflection, Racking, Sizing Building Materials	6,7,12,13
-Building Materials (lumber, glass etc.)	6,7,8,9,10,11,12,14
-Doors & Windows (commercial or self-made)	3,8,9,10,11,14
-Thermal/Moisture Control & Heat Transfer	5,6,7
-Heating Options (solar,wood, conventional)	4,5,10,12
-Power Sources (water, wind)	4,5
-Electrical Wiring & Lighting	4,5
-Plumbing & Waste Disposal	9,13
-Architectural Design & Drafting	1,2,3
-Instructional Materials for Course	2,3

*I.A. Subject Areas

1. Architectural Drafting
2. Communication Technology
3. Drafting/Design
4. Electricity/Electronics
5. Energy & Power Technology
6. Materials & Processes
7. Materials Testings
8. Metals
9. Plastics
10. Production Technology
11. Transportation Technology
12. Wood Technology
13. World of Construction
14. World of Manufacturing

TRANSPORTATION

AIAA. W-1:00-2 Towards an "Appropriate" Transportation Technology. Mark R. Skinner, Program for the Study of Technology, West Virginia University, Morgantown, WV.

Transportation fulfills many needs in our highly diverse yet tightly intergrated economy, including social, direct economic, political, medical, and recreational needs. Several problems have arisen due to the size, extent, and complexity of the transportation network we have developed. For instance, transportation accounts for 25% of our national energy usage (or about 33% if the energy used to construct transportation devices is included). Additionally, much of the environmental degredation which has occurred can be traced directly to transportation: atmospheric pollution (including hydrocarbons, oxides of nitrogen, and lead), water pollution (various chemicals, soil erosion, and salt), and poorly planned development which leads in turn to problems such as flooding and/or the paving of aquifer recharge areas. In the developing nations in particular, better transportation is leading to social problems such as massive urban migration.

It is possible, perhaps, to establish some criteria by which the "appropriateness" of given transportation technologies may be evaluated. These technologies will first have to satisfy peoples' needs. Secondly, these technologies will hopefully tend to foster long-run dynamic stability in the ecosphere, or, at the least, not be detrimental to such stability. Thus technologies which reduce pollution levels, require less land, need less energy, or which lend themselves more readily to planned development would be desirable.

What sort of solutions, or at least directions, can be identified? Obviously, smaller, lighter and more desirable vehicles can reduce the demand for materials in the vehicle construction phase as well as the need for propulsive energy, and will simultaneously reduce pollutant emission per vehicle. It might also be possible to reduce the need for transportation, either by producing and distributing goods locally rather than nationally, as well as by substituting communication for transportation when possible.

While "appropriate" technologies may be more difficult to identify in transportation than in other areas, at the primary and secondary levels Technology Education seems uniquely qualified to encompass the diverse concepts which must be discussed if problems are to be alleviated and beneficial change is to be brought about.

ASSOCIATION BUSINESS

Teacher Recognition Program

David Lorms,
Vice-president for Classroom Teachers

At the recent San Antonio Conference, 46 outstanding teachers were recognized by the AIAA as OUTSTANDING TEACHERS for 1979. Forty-two states and four provinces represented the 46 associations responsible for the selection of the awards.

The Third General Session was addressed by W. C. Newberry, Department of Education at Southwest Texas State University. Newberry was introduced by Art Rosser, head of the Industrial Education Department at SWTSU. Richard Teniente from the Texas Board of Education brought greetings to the 1,000 people in attendance.

Each state association is solicited by the Teacher Recognition Committee of the AIAA each year to select an outstanding teacher. The teachers who received awards had been selected by their peers on the basis of their demonstrated ability in the classroom teaching of the industrial arts. The following factors are used and considered while teachers are being selected:

1. Rapport with students.
2. Ability to motivate student interest in industrial arts.
3. Success in upgrading industrial arts in the total school program.
4. A well-rounded philosophy in industrial arts education.

Each recipient must be an industrial arts classroom teacher below the college level and must be active in pertinent professional educational associations on the local, state and national levels, as well as a member of the American Industrial Arts Association.

The recipients received an engraved plaque and framed certificate of honor from the AIAA.

Recipients for 1979 and their state affiliations are as follows:

Floyd C. Parsons, Alabama
Dennis B. Sharpe, Alberta, Canada
John Rebb, Arizona
John R. Scott, California
Lawrence E. Denton, Colorado
Robert W. Joyce, Connecticut
Edward Donohue, Delaware
Jerry E. Hamm, Florida
David R. Stewart, Georgia
Eric T. Kanemoto, Hawaii
Phillip L. Willey, Idaho
Kenneth Berkley, Illinois
Donald E. Buzzard, Indiana
Larry V. Coy, Iowa
Charles Stinson, Kansas
William A. Hayes, Maryland
Raymond J. Beauregard, Massachusetts
Wayne Hilbert Klotz, Michigan
Thure "Bud" Erickson, Minnesota
William L. Trussell, Mississippi
Francis E. Logan, Missouri
William Olfert, Montana
Jerome J. Kohl, Nebraska
Gary A. Kohnke, Nevada
Carl B. Sweezey, New Brunswick, Canada
Roland P. Cournoyer, New Hampshire
William G. Lemke, New Jersey
Robert B. Laux, Jr., New York
Roy L. Caudill, North Carolina
Issac W. Hill, North Dakota
Alexander Allen, Nova Scotia, Canada
Marlin F. Brewer, Ohio
Gary L. Bell, Oklahoma
Brian J. Aubrey, Ontario, Canada
John Shefler, Oregon
Alan M. Klaich, Pennsylvania
Dennis E. Zenk, South Dakota
Robert Earl Rich, Tennessee
Jim V. Patton, Texas
Leo L. Mower, Utah
Richard D. Bell, Vermont
James R. Doyle, Virginia
W. Norman Reisenauer, Washington
Jack Lee Goodwin, West Virginia
Fred E. Posthuma, Wisconsin
Shad Martoglio, Wyoming

Without the combined efforts of the state associations and the Teacher Recognition Committee of the AIAA, this program could not be as successful as it is each year. The Teacher Recognition Committee wishes to extend a most sincere "THANK YOU" to all participating associations.

The Teacher Recognition Committee for 1978–79 consisted of the following individuals: Chairperson, David Lorms, Lake Jackson, Texas; Dan C. Lopez, San Jose, California; Tommie Barfield, Freeport, Texas; Russel Amling, Mankato, Minnesota; Thomas J. Barber, Kent, Ohio; Ken Gile, Bennington, Vermont; William J. Wilkinson, Springfield, Pennsylvania; John Ross, St. John, New Brunswick, Canada; and William Scarborough, Greensboro, North Carolina.

Ken Henderson, of Denver, Colorado, has been elected Vice-president for classroom teachers and chairperson of the Teacher Recognition Program. Ken will be chairing this important program for the next two years. Please give him your complete cooperation.

AIAA HOUSE OF DELEGATES MEETING

RIVER ROOM - CONVENTION CENTER

San Antonio, Texas
March 2, 1979

ACTION

President Willis E. Ray called the AIAA Annual Business Meeting to order at 0900 a.m.

President Ray appointed Dr. William R. Hoots, Greenville, North Carolina, Parlamentarian for the meeting. President Ray then called upon Dr. Roger Betts to officially seat the Delegates. He then introduced the new and continuing AIAA officers:

Parlamentarian appointed

James E. Good - President
Les Litherland - President Elect
Billy W. Mayes, Sr. - Immediate Past President
David Lorms - Vice-President for Class.Teachers
Ted Nunemaker - "   "   "   "   "
Ervin Dennis - V.P. for Teacher Educators
John E. Bonfadini - V.P. for Supervisors
Charles Earhart - V.P. for State Assoc.Officers
Norma Heasley - V.P., Elem. School Ind. Arts.
Greta Boroff - V.P. for College Students
Donald Rathbun - Executive Director
Ken Henderson - V.P. (elect), Classroom Teachers
Jim Snyder - V.P. (elect) for Supervisors

officers introduced

President Ray then called on Donald Rathbun to read the Minutes of the last meeting in Atlanta, Georgia. Mr. Rathbun stated that each of the Delegates had a copy of the minutes in their possession. A motion was made that the Minutes be accepted by Robert Thrower, New Jersey. The motion was seconded by Mary McEntee, Texas. Motion

minutes approved

to approve minutes as distributed was carried.

President Ray then called upon Donald Rathbun to read the Treasurer's Report. The report was read in detail. Motion to accept report as read was submitted by Franklyn C. Ingram, Michigan. Motion was seconded by Frank Cackowski, Indiana. Motion carried.

Treasurer's
report
approved

Also in connection with the Treasurer's Report,a motion was made by Lee Oringderff, Texas, to redesign the form. Motion was seconded by Douglas Beard, New York. Motion to accept recommendation to redesign form was approved and carried.

redesign
form
requested

President Ray then read the highlights of the President's Report in detail. He stressed the importance of increasing our membership. He said "our goal is to have about 20,000 members." He said, "this year has been the highlight of my career" and asked everyone's support of the new officers. He thanked the Delegates for the opportunity to serve the Association.

President Ray
addressed
delegation

President Ray then called upon Billy W. Mayes, Sr. to read the Acknowledgment Resolutions. Motion to adopt

Acknowledgment
resolution
adopted

MINUTES	ACTION
resolutions in mass was made by Vaughn Croft of Arizona. The motion was seconded by Creighton Alexander, Alabama. Motion carried.	
President Ray then called on Billy W. Mayes, Sr. to read the Standing Resolutions. A motion that standing resolutions be adopted as written was made by Lee Carter, Idaho and seconded by William Scarborough, North Carolina. Motion carried.	Standing Resolutions adopted
Billy Mayes read Current Resolution C-79-1 - AIAA Long Range Planning. Motion was made by Carl York, Illinois to approve resolution and motion was seconded by John Fessant, Oregon. Motion carried.	C-79-1 Long Range Plan adopted
Resolution C-79-2 - Industrial Arts Certification Requirement for Vocationally Funded Programs of Industrial Arts was read to Delegates. Mr. Caron, Virginia made motion that we accept this resolution as read. Thomas Landry, Louisiana seconded the motion. Motion carried.	C-79-2 Certification requirement adopted
C-79-3 - Equality of Rights - Revised. Billy Mayes read the revised resolution. Discussion followed. Motion to accept this resolution as revised was made by	C-79-3 Equality of Rights adopted

MINUTES	ACTION
W. Harley Smith, Maryland. Motion was seconded by Ed Paloncy, Indiana. Motion carried.	
Resolution C-79-4 - Proposed Current Resolution - National Industrial Arts Education Week. Mr. LaClair, New York, moved that the resolution as written be accepted. Bill Sanders, Texas, seconded the motion. Motion carried.	C-79-4 NIAEW 1980 Dates adopted
C-79-5 - Current Resolution - Future Conference Planning. Billy Mayes read the resolution. Motion was made by Mr. Caron, Virginia, to approve the resolution as read. Motion was seconded by Carl York, Illinois.	C-79-5 Future Conference Planning adopted
Bill Sanders, Texas, made a motion to amend the resolution. The amendment was read by Billy Mayes and died for lack of a second. The original motion carried.	
C-79-6 - AIAA and Appropriate Technology - Resolution was read by Billy Mayes. Since the proposer or representative of this resolution was not present, Resolution C-79-6 was withdrawn.	C-79-6 withdrawn
C-79-7 - Competitive Events - Billy Mayes read the resolution. Vaughn Croft, Arizona, made a motion to adopt. Carl York, Illinois, seconded. A lengthy discussion	C-79-7 Competitive Events adopted

followed. President Ray suggested inserting "and" after each WHEREAS. The question was called and C-79-7 was adopted.

President Ray asked for any resolutions which delegates wanted to present for the following year. Franklyn C. Ingram, Michigan, suggested Resolution C-79-3 add the following for next year, "The AIAA believes that all persons, regardless of race, creed, color or sex, should be given equal rights and opportunities under the law and encourage participation in programs of industrial arts at all levels in the schools of all nations."

C-79-3
wording
suggested

Mr. "Bud" Erickson, President, Minnesota Industrial Arts Association, made a motion which would call for the reading of Appreciation to American Industrial Arts Association from his state association. The motion was seconded by Donald Miller, Minnesota. President Ray stated that in this case the motion could be dispensed with and that the body could accept a "Statement of Commendation from the Minnesota Industrial Arts Association." This was supported by Lee Clendenning from Georgia and the group was made aware of AIAA assistance to MIAA and of the positive results.

MIAA
commends
AIAA
on assistance

MINUTES	ACTION
President Ray then asked if there was any New Business. Mr. LaClair, New York read a Presentation on behalf of the AIAA Membership Committee. He recognized five individuals: Messrs. Quinn, Page, Chamberlin, Carter and Stewart and presented a plaque to Harold Quinn in recognition of the Georgia Industrial Arts Association's assistance in that state's reaching 34.4% of their potential in AIAA membership.	New Business Georgia Inds. Arts Assoc. recognized by AIAA.
Mr. Ray asked if there was any other new business. Mr. Charles Earhart asked about the 1978 resolution which called for assisting the following five states: Nebraska, Montana, South Dakota, Minnesota, Michigan, to obtain a state Industrial Arts Supervisor. The response was very favorable and two states have reinstated the position.	AIAA help pays off
President Ray then called President elect James E. Good to the rostrum and presented the gavel to him. The new president stated that this was one of the most exciting business meetings he had ever attended and asked the support of all the delegates.	New President installed.
Mr. Good adjourned the meeting at 10:55 a.m.	

AMERICAN INDUSTRIAL ARTS ASSOCIATION

RESOLUTIONS

Presented to the Delegates February 28, 1979

AIAA 41st Annual Conference San Antonio, Texas

ACKNOWLEDGEMENT RESOLUTIONS

A-79-1 Appreciation to the President

WHEREAS, Willis E. Ray, as President of the American Industrial Arts Association, has given so liberally of his time and talents and has exhibited an outstanding capacity for leadership, and the Association has made exemplary progress under his leadership, be it therefore

RESOLVED, That the Association, through its membership, officers, and Executive Board expresses its fullest appreciation to him.

A-79-2 Appreciation to the Conference Committee and the program and Conference participants

WHEREAS, the 41st Annual Conference of the American Industrial Arts Association was possible through the direct, dependable, and efficient service of a great number of members of the Association, and inasmuch as the Conference has achieved an outstanding level of success, be it therefore

RESOLVED, That sincerest appreciation is expressed to Daniel L. Householder, General Chairperson, to Arthur J. Rosser, Program Chairperson, and to the members of the Conference committees and to all teachers, supervisors, teacher educators and students whose efforts in total produced this Conference.

A-79-3 Appreciation to the E.E.A. SHIP

WHEREAS, The E.E.A. SHIP continues to support and participate in the International Meetings of the AIAA by contributing to the 41st Annual Conference of the Association, and in view of the excellence of this year's commercial exhibits as a feature of the Conference, be it therefore

RESOLVED, That the American Industrial Arts Association expresses its appreciation to the educational exhibitors for their participation in the 1979 Conference.

A-79-4 Appreciation to the Teacher Recognition Program

WHEREAS, The Association is dedicated to encouraging excellence in teaching, and inasmuch as its program of recognition of outstanding teachers is marked with increasing excellence, be it therefore

RESOLVED, That expressions of appreciation are tendered to David P. Lorms, Vice President for Classroom Teachers, and his committee for their contribution in the conduct and promotion of this program, be it also

RESOLVED, That appreciation is expressed to the officers and members of state associations who have participated in the recognition program.

A-79-5 Appreciation to the Executive Board

WHEREAS, Billy W. Hawes, Sr., Immediate Past President, Willis E. Ray, President, James E. Good, President Elect, David Lorms, Vice President for Classroom Teachers, Ted Nunemaker, Vice President for Classroom Teachers, Ervin A. Dennis, Vice President for Teacher Educators, John Bonfadini, Vice President for Industrial Arts Supervisors, Norma Heasley, Vice President for Elementary School Industrial Arts, Charles E. Earhart, Vice President for State Association Officers, and Greta L. Boroff, Vice President for College Students, have given so liberally of their time and talent in providing outstanding leadership and service, and

WHEREAS, The Association has made exemplary progress under the leadership of these Executive Board members, be it herein

RESOLVED, That the Association expresses its fullest appreciation to them.

A-79-6 Appreciation to the Governor of the State of Texas

WHEREAS, Governor William P. Clements, Jr. has supported industrial arts and contributed to the success of the 41st Annual Conference and has supported the operation of the Conference, be it

RESOLVED, That the Association expresses its appreciation to the Governor for his assistance in making this Conference a success.

A-79-7 Appreciation to the Mayor of San Antonio

WHEREAS, Mayor Lila Cockrell assisted in promoting San Antonio as the site of the 1979 AIAA Annual Conference and has supported the operation of the Conference, be it therefore

RESOLVED, That appreciation be extended to the Mayor of San Antonio for her contribution to the success of the Conference.

A-79-8 Appreciation to the Members of the Texas Industrial Arts Association and Texas Collegiate Industrial Arts Association

WHEREAS, The members of the Texas Industrial Arts Association and the Texas Collegiate Industrial Arts Association have given freely of their time, talent, and energies to plan and execute this Conference, be it therefore

RESOLVED, That appreciation be extended to these groups and their members for their contribution to the success of the Conference.

A-79-9 Appreciation to Educational Personnel

WHEREAS, The success of the 41st Annual Conference rests in large measure on the devotion and contributions of the personnel of public schools, collegiate institutions, and state associations, be it therefore

RESOLVED, That the membership of the AIAA through its Executive Board expresses thanks and appreciation to all individuals and groups who contributed to the success of the Conference and particularly to those individuals and groups from the state of Texas for their significant support of the Conference.

A-79-10 Appreciation to the National Office Staff

WHEREAS, The role of the national office staff of the Association is vital to the effectiveness of service to members of the Association, be it therefore

RESOLVED, That the membership and the Executive Board express their appreciation to Donald L. Rathbun, Executive Director, and the other members of the national office staff.

A-79-11 Appreciation to the Deputy Commissioner of the Texas Education Agency

WHEREAS, Dr. L. Harlan Ford has contributed to the 41st Annual Conference on behalf of the State of Texas, be it therefore

RESOLVED, That the Association expresses its appreciation to him for his assistance in making this Conference a success.

A-79-12 Appreciation to the State Board of Education

WHEREAS, Richard Teniente has contributed to the 41st Annual Conference on behalf of the State of Texas, be it therefore

RESOLVED, That the Association expresses its appreciation to him for his assistance in making this Conference a success.

A-79-13 Appreciation to the Executive Secretary of the Texas Industrial Arts Association

WHEREAS, Ron Foy has contributed to the 41st Annual Conference on behalf of the State of Texas, be it therefore

RESOLVED, That the Association expresses its appreciation to him for his assistance in making this Conference a success.

A-79-14 Appreciation to Millersville State College and the Archivist

WHEREAS, Millersville State College in Millersville, Pennsylvania, set aside a section of their library as archives for the American Industrial Arts Association, and

WHEREAS, Memorabilia, official papers, and historical items of the Association have been collected and housed at Millersville State College since 1974, be it therefore

RESOLVED, That appreciation be extended to Millersville State College and to Robert Coley, Archivist, who has been responsible for the archives since its inception, and for his work in organizing, labeling, and storing the records and published materials of the American Industrial Arts Association.

Bob Hostetter, AIAA Chairperson of History
and Archives Committee

STANDING RESOLUTIONS:

S-79-1 The AIAA believes that excellence in teaching is the foundation of a good education system. The Association, therefore, recommends that only persons who have a minimum of a bachelor's degree with thirty semester hours (or equivalent) of course work in industrial arts and a valid teaching certificate in industrial arts be permitted to teach industrial arts.

S-79-2 The AIAA believes that industrial arts programs offer one of the best educational opportunities which will help young people grow to the maximum of their individual abilities; therefore, the Association believes that a program of industrial arts should be offered in all elementary, middle, and secondary schools in the nation.

S-79-3 The AIAA believes that the accreditation of programs and institutions assures the continued development of quality programs of education. To this end, the AIAA encourages its committees and member councils to formulate and/or update accreditation standards for all programs of industrial arts in elementary, middle, and secondary schools, and in colleges and universities. Standards should be designed to promote improvement through self-evaluation as well as provide criteria to be used by accreditation agencies.

S-79-4 The AIAA believes that maximum efforts should be directed toward the development of industrial arts student organizations at all levels.

S-79-5 The AIAA believes that all persons, regardless of race, creed, color or sex should be given the opportunity to participate in programs of industrial arts in the schools of all nations.

S-79-6 The AIAA believes in and continues to support the transition to the international system (SI) of measurement, and encourages all of its members to include instruction on the metric system in their classes.

S-79-7 The AIAA believes that all educators and all professional associations should work together in the education of the youth of our schools to better prepare them for an ever-changing technological society.

S-79-8 The AIAA believes that maximum efforts should be directed toward informing all segments of society, including a business-industry-education partnership, of the valuable contribution of industrial arts to the youth of our nation.

S-79-9 The AIAA believes in and supports the efforts of the International Relations Committee in strengthening industrial arts associations and programs in all nations of the world.

1979 CURRENT RESOLUTIONS

C-79-1 AIAA Long-Range Planning

WHEREAS, The American Industrial Arts Association should use the best in management strategies and tactics, and

WHEREAS, "Management by Objectives" is recognized as an important and useful management tool, and

WHEREAS, The AIAA Mission and Goals Committee has assisted the AIAA Executive Board in identifying goals and objectives for FY '80 and beyond, and

WHEREAS, The AIAA Executive Board has approved a Program of Work for FY '80 based upon the mission and broad goals for the Association, be it therefore

RESOLVED, That the 1979 AIAA House of Delegates supports in principle this long-range planning process, and, be it further

RESOLVED, That the AIAA House of Delegates endorses the seven broad goals and the fifty-six specific objectives of the FY '80 Program of Work, and, be it further

RESOLVED, That the AIAA House of Delegates commends and encourages the AIAA officers, the National Office Staff, the AIAA Committees, and individual member professionals in this important work.

Passed.

Donald G. Lux, Chairperson
AIAA Mission and Goals Committee

C-79-2 Industrial Arts Certification Requirement for Vocationally Funded Programs of Industrial Arts

WHEREAS, Industrial arts is recognized by PL 94-482 as eligible for funding through vocational education as it contributes to two purposes of the Act, and

WHEREAS, Industrial arts teachers are prepared to deal effectively with the purposes, goals, and instructional methods of industrial arts to benefit students, and

WHEREAS, Practices in some states are permitting non-industrial arts certificated persons to teach industrial arts courses and/or requiring vocational certification of industrial arts teachers to receive vocational funding for industrial arts programs, therefore be it

RESOLVED, That the American Industrial Arts Association support the position that certificated industrial arts teachers are fully capable of teaching industrial arts to meet and exceed the guidelines for federal vocational funds without additional endorsement or certification and that teachers without industrial arts certification not be permitted to teach industrial arts courses regardless of funding source.

Passed.

AIAA--IAD/AVA Liaison Committee
C. Dale Lemons, Chairman

C-79-3 Equality of Rights

WHEREAS, The Women and Minorities Committee is an operating committee of the American Industrial Arts Association, and

WHEREAS, The Women and Minorities Committee is charged with providing impetus to the American Industrial Arts Association's activities aimed at increasing equal opportunity in industrial arts, and

WHEREAS, The Women and Minorities Committee is responsible for affirmative action in the direction of supporting the advancement of women and minorities in the field of industrial arts, and

WHEREAS, The American Industrial Arts Association believes that all persons, regardless of race, creed, color or sex should be given the opportunity to participate in programs of industrial arts in the schools of all nations, be it therefore

RESOLVED, That the American Industrial Arts Association supports and endorses equality of rights under the law by encouraging increased participation of all minority groups in industrial arts education at all levels.

Passed

Denise H. Keller, Chairperson
Women and Minorities Committee

C-79-4 National Industrial Arts Education Week

WHEREAS, The progress and well-being of the citizens of the United States depend to a great extent upon the perennial education and equable training for "life" as provided in the school systems of this country, and

WHEREAS, Profound sociological, economic, and technological changes in our vibrant society are bringing forth rapid modifications in the structure and nature of "life" itself, thereby placing new and additional responsibilities on the educational system, and

WHEREAS, Professional contributions of industrial arts education programs of this nation have guided and instructed youth and adults in the preparation for "life", be it therefore

RESOLVED, That the American Industrial Arts Association Delegate Assembly designate the week of November 10-15, 1980 as NATIONAL INDUSTRIAL ARTS EDUCATION WEEK, with the theme "Industrial Arts: The Spirit of Progress."

Passed.

Franklyn C. Ingram, Chairperson
Public & Professional
Relations Committee

C-79-5 Future Conference Planning

WHEREAS, The American Industrial Arts Association should attract a maximum number of its membership to the international conference and

WHEREAS, Many of its membership have daily classroom commitments that make it difficult if not impossible for them to attend with the current Monday through Friday format, be it therefore

RESOLVED, That the 1979 House of Delegates charges the Executive Board of the American Industrial Arts Association to consider holding a future conference over a weekend.

Passed unanimously.

Ron Lutz, Chairperson
Ad hoc Special Needs Committee
Franklyn C. Ingram,
Representative

C-79-6 AIAA and Appropriate Technology

WHEREAS, The American Industrial Arts Association has always supported the use of technology for the benefit of human beings, and

WHEREAS, The Appropriate Technology Movement is supported by people throughout the world with the goal of using technical means for the improvement of the quality of life of all people, and

WHEREAS, The focus of the Appropriate Technology Movement is on Human and Community Development, and

WHEREAS, Industrial arts programs offer one of the best opportunities for students to study, understand, and utilize the concepts of appropriate technology, be it therefore

RESOLVED, That the 1979 American Industrial Arts Association House of Delegates supports the continued efforts of the International Relations Committee to provide the Association with programs and information about appropriate technology, and, be it further

RESOLVED, That the 1979 American Industrial Arts Association House of Delegates encourages by passage of this resolution, the inclusion in future planning by the AIAA officers of appropriate technology programs and publications, and, be it further

RESOLVED, That the 1979 American Industrial Arts Association House of Delegates fully supports the adoption and diffusion of appropriate technology concepts within industrial arts curricula.

NOTE ——> Resolution was withdrawn due to policy technicality which mandates the presence of either the proposer of the resolution or his/her representative.

Paul W. DeVore, Professor and
Chairman
Technology Education Program
West Virginia University

C-79-7 Competitive Events

WHEREAS, The American Industrial Arts Student Association is a student organization founded through the American Industrial Arts Association, and

WHEREAS, The American Industrial Arts Student Association was founded for the development and growth of our youth through industrial arts programs and related student activities, and

WHEREAS, Competitive events are provided as an opportunity for students to have a full range of experiences, and

WHEREAS, The American Industrial Arts Association is in full support of the growth of the American Industrial Arts Student Association in that these competitive events are planned by the American Industrial Arts Student Association executive board and board of directors with the support of the membership, be it therefore

RESOLVED, That the American Industrial Arts Association support events for student competition held through the American Industrial Arts Student Association's local, state, and national conferences.

Passed.

Vaughn Croft, Arizona

EDITED COPY

AIAA FOURTH GENERAL SESSION
41st ANNUAL AND 8th INTERNATIONAL CONFERENCE
SAN ANTONIO CONFERENCE
THURSDAY, MARCH 1, 1979
10:30 - 12:00 a.m.

POSITIVE PLANNING - PERSONNAL DEDICATION DYNAMIC PROFESSIONALISM - THE KEYS TO THE FUTURE SUCCESS OF INDUSTRIAL ARTS EDUCATION

By
James E. Good
AIAA President-Elect
Greece Central School District
Rochester, New York

INTRODUCTION

When I received my master's degree from the University of Northern Colorado, Fred Kagy told me I would have to serve a professional apprenticeship and prove myself in a variety of professional situations if I had any aspirations of assuming a top leadership position in the American Industrial Arts Association. It didn't occur to me that this apprenticeship would include an opportunity to establish a close working relationship with two such giants in the profession as Willis Ray and Ralph Steeb. Their unselfish dedication, drive, persistence, and behind-the-scenes activities on behalf of industrial arts education the past two decades have greatly enhanced the role and contributions of industrial arts at all educational levels. I sincerely hope that history accurately records their contributions and that Willis and Ralph are given the credit they so richly deserve.

The Executive Board of the AIAA has approved a plan of action which will greatly improve the effectiveness of the AIAA in providing the essential visibility and services needed to enhance maximum support for industrial arts education programs and personnel at all levels.

Since it will be my responsibility as the incoming president to ensure that the goals and objectives in this plan are achieved during the next year, I have been asked to outline the key ingredients of this thrust and suggest strategies where you can assist.

THE IMPACT OF STATUS-QUO

Before going into the details of this plan, I want to tell you of an enlightening experiment which I hope will set the tone for this presentation.

Processionary caterpillars feed upon pine needles. They move through the trees in a long procession, one leading and the others following - each with his eyes half closed and his head snugly fitted against the rear extremity of his predecessor.

The great French naturalist, Jean Henri Fabre, after patiently experimenting with a group of the caterpillars, finally enticed them to the rim of a large flower pot where he succeeded in getting the first one connected up with the last one, thus forming a complete circle which started moving around in procession and which had neither beginning nor end.

Fabre expected that after awhile they would catch on to the joke, get tired of their useless march, and start off in some new direction. But not so. Through sheer force of habit, the living, creeping circle kept moving around the rim of the pot - around and around, keeping the same relentless pace for seven days and seven nights, and would doubtless have continued longer had it not been for sheer exhaustion and ultimate starvation. Incidentally, an ample supply of food was close at hand and plainly visible, but it was outside the range of the circle so they continued along the beaten path.

They were following instinct - habit - tradition - precedent - past experience - "standard practice" - or whatever you may choose to call it, but they were following blindly. They mistook activity for accomplishment. They meant well, but they got no place. I don't want to infer we are circling in a beaten path and not accomplishing anything because this isn't true. However, no matter how much impact we are making upon the total education of the youth in the public schools in America or how much we accomplish, far too many industrial arts programs fail to achieve their potential of preparing youth to understand and contribute to our industrial society. We fall short of our objectives because much of the time we are following habit, basing our judgements on past experience - precedent - the known, playing it safe with our heads fitted snugly against the rear extremity of tradition with our eyes half closed against change.

We also have a noticeable dichotomy between the "Monday morning practitioner" who is implementing a rather complacent and traditional program with little if any regard for the relationship of classroom activities to the technological environment in which their students live, and the "futurist" who has a good grasp of technology but little understanding of the Monday morning realities of the classroom.

In many ways we have become our own worst enemy by failing to capitalize on what we can and are doing extremely well in the educational system. For example, many of our colleagues have not thoroughly capitalized on the versatility and flexibility of industrial arts education to meet a variety of individual needs regardless of interest, desires, capabilities, maturity and career aspirations. During the time period we were lobbying for the independent inclusion of industrial arts in federal vocational education legislation without losing our identity or compromising our desires for a broad base program, it became evident that Congress and many U.S.O.E. officials were looking to us as potential charge agents to improve the quality of vocational education as well as education in general.

POTENTIAL

Many interesting developments have begun to take place since we have emerged as the only subject area mentioned by name in the 1976 amendments in the basic grant funding section of the law.

If sufficient funds--or state support--were available, there is not a single objective or contribution of industrial arts which would be ineligible for federal funding at the secondary level as the law is now written. While it is implied but not clearly stated that industrial arts is not responsible for preparing youth for entry level employment, we have considerable evidence that students who successfully complete aspects of a broad-based, comprehensive industrial arts program are not only prepared to understand and contribute to our industrial and technological society, but possess the essential skills to be hired as productive employees who possess all of the essential human ingredients for further training and advancement in the career field of their choice.

More important, the cost of educating a student in a comprehensive industrial arts educational environment is far less than to train that student in a traditional vocational program. Perhaps many of us would do well to keep good follow-up records on our students. Our respective boards of education may be interested in these statistics.

There is also considerable room for improvement in capitalizing on the role of industrial arts in the "Back-to-Basics" Movement. For example, New York City implemented a really fine publications program in many of their elementary schools several years ago. I am sure most of you have seen the literature on this program which enables the student to get involved in a variety of publishing activities. The New York Times picked right up on this four years ago and concluded that there was definite evidence that students participating in this program were showing remarkable achievement in their language arts skills. The New York State Education Department just completed a major study which was spread over several years and has come to the same conclusion as the New York Times. In fact, they claim a student has a better than 99% chance of improving his language arts skills by participating in the program. I am sure many of your programs are also having a positive impact on the basic skill achievement of your students. However, I would be pleasantly surprised if you were capitalizing on these accomplishments in the promotional department.

ROLE OF AIAA

These two examples of our actual and potential impact in education are among the reasons the Executive Board has elected to launch an intensive campaign to improve our leadership and management system which will ensure the quality development, implementation and promotion of industrial arts programs and activities.

As the only national professional association concerned exclusively with representing the integrity and best interests of industrial arts personnel and program at the local, state and national levels, the AIAA has the responsibility of ensuring that we avoid the temptation to follow blindly in a beaten path as the caterpillars did and open our eyes to the possibilities around us.

FY 80 PROGRAM OF WORK

The key ingredients of our plan have been included in a program of work which includes seven goal areas and fifty-six attainable objectives. This program of work has been distributed and explained to committee members, state representatives and other key personnel throughout the week. It represents a most ambitious and exciting action plan which will greatly increase the services of the AIAA to its membership.

The plan is designed to facilitate a unification of industrial arts professionals as a means of enhancing the role and contributions of industrial arts program and activities at all educational levels.

GOAL I: MEMBERSHIP

Our first goal area and number one priority is membership. We have established a goal of 20,000 members by June 30, 1984 with an intermediate goal of 10,000 by June 30, 1980. This total represents approximately 33% of our potential, and based on our best estimates this number would provide us with sufficient revenue and unified talent to provide all essential services for the industrial arts profession. With less than 10% of our potential membership currently belonging to the AIAA, it is impossible to provide the type of visibility, clout and special services needed to ensure maximum support of industrial arts programs and personnel.

Ironically, membership is like weather forecasting. Everyone talks about it, but little is accomplished to change the outcome. We did not want to fall into this trap, nor did we want to develop a plan to achieve a conservative projection. Consequently, the Executive Board has taken the following steps to ensure attainment of this most important goal:

1. Appointed Tom LaClair of New York, a proven industrial arts professional and human dynamo, to spearhead this priority and build on the direction

established by Don Rathbun, our Executive Director, and Gene Martin of Ohio, our former National Membership Chairperson. Tom is well aware of the risks, pressures, time commitment, and sacrifices associated with this role, but he has enough faith in leaders such as yourself that if we work hard as a team of professionals we will achieve our goal and realize the benefits for industrial arts programs and students which are long overdue.

2. A comprehensive 5-year membership plan was prepared by Tom in cooperation with the Administrative Committee and approved by the Executive Board at our November meeting. This plan includes specific tasks for each objective, job descriptions for all personnel involved, a comprehensive communications network, and an in-service training program for the membership network personnel which has been conducted at this conference.

3. A membership incentive plan was also approved by the Executive Board at our November meeting which will give affiliated state associations a 10% reimbursement of dues paid for all membership totals that exceed a base average of their past three years of AIAA membership, up to 25% of their potential. Beyond 25%, they will receive a 20% reimbursement.

4. For the college students who join both the AIAA and AIACSA, the cost is only $8.00 if their college or university is an institutional member of the AIAA. This is a considerable savings for the student since the regular rate would be $12.50 for the AIAA and $3.00 for AIACSA for a total of $15.50. As an outgrowth of this plan, our objective for FY 80 is to:
   a. Increase institutional membership to 25% of our potential.
   b. Increase college student membership in the AIAA to 25% of our potential.

Dr. Willis Ray played a most instrumental role in spearheading a major increase in institutional membership, and we are most appreciative of his efforts as well as the professional spirit exhibited by the colleges and universities who became institutional members this past year.

Dr. Ray has also agreed to take the leadership in developing and implementing a plan which will achieve another membership objective which is to obtain a minimum of 25 sustaining (company) members.

GOAL II: GOVERNMENTAL RELATIONS

Our second goal area is governmental relations. Our intents with this goal are to increase our role in existing and proposed federal and state legislation and maintain a close working relationship with appropriate governmental agencies to the extent that opportunities are readily available to develop, implement and maintain a comprehensive industrial arts program at all educational levels.

Nine (9) objectives have been approved in this area, and much of the leadership for their attainment has been assigned to the Legislative Committee chaired by the talented and energetic Dr. Kendall Starkweather of the University of Maryland, who has successfully directed our legislative activities this past year. This committee will be working in close cooperation with Don Rathbun, our Executive Director, and the Legislative Committee of the Industrial Arts Division of the American Vocational Association (AVA), chaired by Robert Nogueira of New Jersey. The specific objectives in this goal area include:

1. Updating and careful monitoring of our congressional communications network to ensure that all congressional districts have at least one industrial arts professional making regular contacts and conducting appropriate follow-up activities with their political leaders.

2. We also plan to prepare timely information and instructions regarding legislative matters and submit to all congressional network members to assist them in promoting the role and contributions of industrial arts education with their respective congressmen and senators.

3. We will continue to maintain effective communications with all USOE personnel with emphasis on career and vocational education. We are most encouraged by the support, respect, assistance, and confidence extended to us by USOE officials, and we want to build and expand our influence in matters of national interest to industrial arts education.

4. We want to strengthen our working relationship with congressional leaders and key education committees on Capital Hill and seek support for the development and/or continuation of legislation which will be in the best interest of industrial arts education. One of our objectives deals specifically with increasing appropriations which will provide direct benefits for industrial arts personnel and programs.

5. As a means of improving communications with groups who can really assist in expanding the role of industrial arts programs in the public schools, two reports will be prepared and hopefully presented to the National Advisory Council for Vocational Education and the State Chief School Officers.

6. Recognizing the need to keep our total membership informed about legislative matters, a minimum of two timely and helpful legislative updates will be prepared and distributed to the total membership.

7. As a means of determining the extent that industrial arts programs have been included in state plans for vocational education and degree they are being financially supported, we are asking the Research Committee, chaired by Dr. Raymond Lolla of Temple University, to conduct this study for us.

8. The plan also calls for providing technical assistance to affiliated states experiencing difficulty in realizing benefits for their industrial arts education program from federal legislation

GOAL III: COMMUNICATIONS/PUBLICATIONS

Our third goal concentrates on communications and publications.

During the upcoming year, we would like to implement a diversified communications program which will include timely information to the membership including publications which reflect contemporary issues, newsletters, membergrams and a quality professional journal. Eight objectives have been developed in this goal area which include:

1. The preparation and dissemination of an informational packet to all new members. We would like our colleagues who unite with us for the first time to have some timely information which will be of immediate assistance to them and perhaps equally important, to make them feel good about us from the beginning.

2. We want to strengthen our working relationship with state supervisors because we believe the effectiveness and contributions of industrial arts education programs depend to a large extent on quality leadership implementing sound management and supervisory practices. We will be

turning to the U.S. Office of Education and our liaison with top U.S.O.E. officials, Bill Dennis, for assistance in this regard. Hopefully, this will result in a leadership workshop jointly sponsored by USOE, AIAA, IAD/AVA and the ACIAS.

3. We will also begin the implementation of a master re-affiliation plan approved by the Executive Board in November 1977. Our objective for FY 80 is to renew our affiliation with all states and territories in Region 1 utilizing the expertise of the Affiliation Committee, chaired by Dr. Gerald Lovedahl of South Carolina.

4. The Publications Committee, chaired by Dick Vasek of Mississippi State, completed an extensive survey of publications needs this past year. This next year we plan to develop and publish a minimum of five booklets on monographs which reflect priority topics included in this report. For your information, the results of this survey will appear in the March issue of M/S/T along with an invitation to the membership to submit a proposal to develop one of these topics. I hope many of you will give this offer serious consideration.

5. Without question, the biggest criticism I received during the oversight and feedback hearings I conducted during my term as president-elect related to the poor quality of articles in M/S/T. Objective Number 5 in our program of work states that we will identify, develop and publish in M/S/T a minimum of 40 articles or 5 per issue reflecting tapes of priority interest and concern to the membership. Considerable behind-the-scenes are already underway to ensure the attainment of this most important objective. For example, I will seek Executive Board approval

at our post-conference meeting to establish a special Ad Hoc Committee to expedite this priority in cooperation with the MS, chaired by Dr. Michael Dyrenfurth of the University of Missouri, to expedite this priority in cooperation with the M/S/T editorial board and national office staff. I would also like to invite each of you to prepare or encourage others in the field to prepare an article on a topic which you believe will be of real value and interest to our membership.

6. Knowing full well that M/S/T will not remotely resolve our publications responsibility to the membership, we have committed ourselves to publishing a minimum of two newsletters or membergrams this next year which contain timely information and special services provided by the AIAA.

7. Thanks to the super cooperation of Charlie Earhart and the American Council of Industrial Arts State Association Officers, we prepared and distributed a conference promotional brochure to over 30,000 secondary principals and school administrators this past year. The Conference Committee, under the leadership of Dr. Donald Lauda of Eastern Illinois University, will prepare and distribute an even better brochure promoting the 1980 Conference. On behalf of the Executive Board, I would like to express my sincere thanks to all of you who participated in the printing and distribution of these brochures this past year, and we welcome your support and assistance in the distribution of the second edition.

8. We have also committed ourselves to the publication and distribution of an informational brochure for use by junior and senior high counselors in motivating students to select industrial arts classes. We have asked

the Public and Professional Relations Committee, chaired by Dr. Frank Ingram of Central Michigan, to assume the responsibility for attaining this objective.

GOAL IV: PROFESSIONAL SERVICES

Our most extensive goal area has been classified as professional services and contains 15 action packed objectives. Our efforts in this regard include:

1. Adequate support for AIASA and AIACSA. We are extremely proud of these two youth organizations and plan to assist AIASA to whatever extent necessary to ensure that they become the largest and most responsive youth organization in America over the next several years. I can't begin to tell you the benefits to industrial arts if this group were to attain 33% of their potential membership or 2.6 million students. I can assure you with this level of support industrial arts would not only become a mandated subject in the secondary schools but more than enough funds would be available to ensure a comprehensive program in all of our schools. AIACSA is our feeder for the future, and we must continue to assist them in their reorganizational efforts. This is the reason we approved such an attractive incentive package to introduce our future teachers to the American Industrial Arts Association.

2. The Recruitment Committee, under the chairmanship of Dr. Donald F. Smith of Ball State University, will take the leadership in developing and implementing a year-round placement service for our members.

3. As most of you are aware, the U.S.O.E. awarded a contract to VPI for the purpose of developing a data base and standards for industrial arts programs and youth club activities. We will cooperate to the fullest extent

with the project director, Bill Dugger, and his staff in this project. The outcome of this project means a great deal to the future role and contributions of industrial arts education. I hope you take the time to familiarize yourself with this program.

Recognizing the responsibility of industrial arts to meet the needs of all students, we have established a Special Needs Ad-Hoc Committee, chaired by Dr. Ronald Lutz of Central Michigan University, to ensure that the AIAA properly addresses itself to our obligations and responsibilities in this regard.

We will also be conducting a rather extensive needs assessment study as part of our desire to identify priority areas of service and potential objectives for FY 81. We want to know where we can be of greatest assistance to our members. The Membership Committee under the direction of Tom LaClair will also be responsible for this objective. We welcome your input and suggestions at any time in this regard.

It's nice to have a paid staff to carry out many of our responsibilities. However, we cannot afford the size of staff and resources needed to accomplish all of our goals and objectives. Keeping this in mind, we have approved an objective which calls for the development of a directory of personnel who are willing to assist the AIAA in completing select tasks. We will depend on Don Smith and the Recruitment Committee to pursue this objective for us. A few hours spent by several hundred of our colleagues applying unique skills or talents in the completion of a defined task will greatly facilitate a united effort towards maximizing a shared service package for our members, not to mention the financial relief to the association. A good example of this objective was the design and printing of 1,000 copies of the FY 80 program of work which was the united effort of three school districts for a total cost of less than $50.00 to the association. Commercially, this job would have cost over $1,000.

Parallel to this objective we are asking the Special Services Committee, chaired by Dr. Thomas Wright of Ball State, to expand and promote our computer talent bank of outstanding personnel resources which is readily available from our national office. In addition, we are asking this committee to develop a list of possible services which could and should be provided by the AIAA, complete with details related to benefits, procedures and costs. This is another example of our efforts to identify and respond to the needs of our membership.

This goal area also includes the identification of existing industrial arts programs and approaches specifically designed to meet the needs of gifted students. The Curriculum Committee, under the chairmanship of Dr. Gary Linereur of Northern Illinois University, will be responsible for this objective.

GOAL V: PUBLIC RELATIONS

Public relations is our fifth goal area and focuses on the development and implementation of a comprehensive program which will acquaint the general public with the role and contributions of industrial arts programs with emphasis on strengthening our relationship with community agencies, business, industry and educational leaders.

Our key focus in this area is the promotion and implementation of our first National Industrial Arts Education Week which will be held November 12-16, 1979.

The Public and Professional Relations Committee, under the chairmanship of Dr. Frank Ingram of Central Michigan University, has been working hard this past year preparing promotional materials and guidelines which will assist our affiliates and members in celebrating this historical event. I hope you have taken the time at this conference to pick up your packet of promotional materials and plan to capitalize on this opportunity to promote the industrial arts program in your district. Our program of work calls for the continuation of this event on an annual basis with a goal of making each one bigger and better.

We also plan to finalize guidelines and a timetable for establishing a National Advisory Council for Industrial Arts through the leadership of a special Ad-Hoc Committee chaired by Dr. Dale Lemons of the University of Wyoming.

Another objective calls for the development of a cooperative working relationship with a minimum of two community-based programs such as Junior Achievement through the efforts of the Allied Student Programs Committee, chaired by Harold Bretz of Louisiana.

The Public and Professional Relations Committee will also complete objectives related to:

1. The development of a slide presentation describing the role and contributions of industrial arts at all levels.

2. The preparation and dissemination of a brochure focusing on industrial arts and school-community relationships.

3. Updating the brochure, "Why Your Child Should Take Industrial Arts."

GOAL VI: SPECIAL RECOGNITIONS

Our sixth goal area focuses on the identification and recognition of exemplary leaders in our field and will include:

1. A continuation of our teacher recognition program.

2. Continuation of our special citations program.

3. Recognizing members and states who meet their membership quota.

4. Special recognition of all states in Region 1 who renew their affiliation with the AIAA.

5. Recognition of industrial arts personnel who have given their time and talent to the on-going operation of the AIAA.

GOAL VII: PROGRAM UNITY

Our last goal area focuses on program unity and this year we plan to begin an effort in this regard with three objectives which focus on:

1. The identification of three model programs in each state and publicizing their unique features.

2. Preparing a directory of curriculum guides and key resources available in each state. Both of these objectives have been assigned to the Curriculum Committee.

3. The third objective relates to the dissemination and promotion of the AIAA publication on "Recommended Standards for Industrial Arts Programs and Professionals," prepared by the Accreditation Committee currently being chaired by Jim Parnell from Colorado.

In addition to the 56 objectives contained in the FY 80 program of work, we will maintain 32 active standing and operating committees in accord with Article IV, Section 1, of the constitution. The coordination of these committees which involves over 300 members will be the responsibility of our new president-elect, Dr. Les Litherland, who is prepared to assume this responsibility.

CONCLUSION

Unlike the caterpillars, we have our eyes wide open, a clearly defined direction, and are ready to begin a professional service package which will enable industrial arts education to lead the way in preparing today's youth to meet the technological challenges of tomorrow.

As members of this audience, you have distinguished yourselves as the pioneers who can ensure that the goals, objectives and dreams described in this package will become a reality. In the spirit of unity, pride and responsibility for your chosen profession, I am asking you to carry out two tasks prior to April 1, 1979:

1. Identify a minimum of one task or assignment you are willing to complete this coming year in support of our program of work and submit this information to the national office or to an Executive Board member.

2. Recognizing that membership is our number one priority, demonstrate your faith in the AIAA by contacting a minimum of one industrial arts teacher in person or by phone who is not a member of the AIAA and convince him or her to join our crusade. Follow up this initial contact by letter with a membership form which is available in any issue of M/S/T and maintain follow-up contact until you succeed.

Your involvement will make a difference. Don't let us down!

AMERICAN INDUSTRIAL ARTS ASSOCIATION

President's Report
1978-1979
Willis E. Ray

Introduction

If one were to use a slogan or a theme that would describe Association operations this year, it would be stated something like "getting more done with less" or "learning how to live better within the budget." And it has been a good year! The budget for 1977-78 (FY '78) was monitored and controlled (adjusted) so that expenses did not exceed income. It appears that the 1978-79 (FY '79) budget will also be one which reflects the general fiscal mood for the country--that mood being "living within means", "reducing taxes", and "maintaining or improving conditions" of the body politic.

One would think that "cutting back" would reduce services to members and cause hardships for the National Office. Only the latter has been the case this year. In many ways, services to members have been maintained or even improved over the year.

Executive Board

Article VII of the AIAA *Constitution and Bylaws* provides the authority for the Executive Board. The Board is to administer the affairs of the Association and to take whatever actions it decides would be in the best interests of the Association, within the constraints of other articles of the *Constitution and Bylaws.*

This year the Board has functioned well. The following persons have served:

Willis E. Ray, President
James E. Good, President-Elect
Billy W. Mayes, Sr., Past President
David P. Lorms, Vice President for Classroom Teachers (1)
Ted Nunemaker, Vice President for Classroom Teachers (2)
Ervin A. Dennis, Vice President for Teacher Educators
John E. Bonfadini, Vice President for Supervisors
Charles E. Earhart, Vice President for State Association Officers
Norma Heasley, Vice President for Elementary School Industrial Arts
Greta L. Boroff, Vice President for College Students
Donald L. Rathbun, Executive Director

National Office Staffing

Budget shortages have caused the Board to reduce National Office staffing this year to a small number of dedicated persons. Donald L.

Rathbun has managed the affairs of the office in a highly efficient manner.

The staff has concentrated upon membership, financial records, publications, international conference, and governmental contacts, among other items. Contacts with the membership (correspondence et cetera) have been maintained at a most acceptable level. The following persons have served with distinction:

Donald L. Rathbun, Executive Director
Ronald W. Applegate, Director of Student Organizations
(through 10-27-78)
Joan S. Alikhani, Records and Bookkeeping
Marily M. Sharkey, Editor (part time)
Sally Scrimgeour, Advertising (part time)
Cecile O'Marr, Secretary (part time)

Members of the Association should be proud of the work that has been accomplished by these persons this year. The National Office staff appreciates your understanding of a difficult situation. With additional resources they could provide even improved services over the present level.

House of Delegates 1978

In Atlanta, the House of Delegates passed ten Current Resolutions, defeated one Current Resolution (as amended), and defeated one Current Resolution tabled from the 1977 Conference in New Orleans. The Executive Board took actions throughout the year in support of the resolutions that were approved by the House of Delegates.

Of special note were the resolutions that called for state support of state supervisors of industrial arts. Contacts were made with five states to encourage industrial arts state supervision within the appropriate departments of state. Also of significance was the resolution supporting the establishment of a National Industrial Arts Education Week (NIAEW) in November of 1979. Selected committees, the National Office, and the Board are working to cause the NIAEW to become an important "happening" this autumn.

Membership

Effective July 1, 1978, Association dues were increased. This was done after careful study of the needs of increased revenue. In addition, a formal survey was conducted of the membership.

It would appear that Association membership has been reduced somewhat by the dues increase. Appropriate plans were made to take into consideration a temporary, modest decrease in membership. Therefore, a well-designed and well-engineered membership crusade is presently being placed in position. Under the most able leadership of Thomas D. LaClair, Liverpool Central School District, New York, a membership plan of action has been developed. Membership can and must be increased to ensure maintenance and improvement of services to members.

The Executive Board, after long and careful study approved a dues incentive plan for FY '80 (starting July of 1979). This plan will encourage state affiliates to share in the rewards and responsibilities of increased membership.

The Association enjoys a solid, year-in-year-out core of dedicated members. There does seem to be a problem with membership renewals of persons who join once and then drop out. The Membership Committee and the National Office have been working on this problem this year. The ultimate goal is to encourage a stable membership level of 20,000 members by 1984. This level of membership will provide the Association with the needed representation to accomplish the needed promotion of the profession.

Student Associations

The AIAA has had a special interest in two student associations. These are the American Industrial Arts Student Association (AIASA) and the American Industrial Arts College Student Association (AIACSA). There have been some important, positive developments this year.

At the 1977 AIAA International Conference in New Orleans, the AIAA Executive Board took action to encourage AIASA to incorporate as a legal entity. In 1978, in Atlanta, an official Board of Directors of AIASA, Inc. was convened. In November of 1978, AIASA, Inc. employed a full-time Executive Director, Ronald W. Applegate. Offices of AIASA will be maintained within the AIAA National Office in Washington, D. C. It seems most apparent that AIASA has grown in recognition, stature, and membership. The AIAA wishes them nothing but the best in the future.

During the 1978-79 Association Year, there has been evidence of renewed interest and improved organization of AIACSA. A new AIACSA Constitution was approved in 1978. Related to the promotion of Institutional Memberships of AIAA, a dues incentive plan has been placed into effect that will encourage college students to join the AIAA and AIACSA. Without much question, potential teachers should learn to exhibit professionalism early in their collegiate days if it is to become an important way of life in their career after commencement. These accomplishments are to be applauded. The Association will benefit over the years by a strong AIACSA.

Association Administration

The AIAA Executive Board has met three times this year. The first meeting was held March 3, 1978 at the conclusion of the 1978 Atlanta Conference. The mid-year meeting was held in Washington, D. C. on November 16-17-18-19. The third meeting was held in San Antonio, prior to the conference, on February 25-26, 1979. The minutes of these meetings are on file in the National Office and are available for inspection and study by Association members.

In general, the Executive Board was guided by three principal objectives. These were: (1) to be fiscally responsible with the monies of the Association, (2) to improve services to members during a period of scarce resources, and (3) to enhance broad-based industrial arts programs at all levels of instruction. Actions of the Board have been taken in the best interests of the Association, and the industrial arts profession, after deliberate study and serious discussion. Agenda of the Board have been shared with AIAA State Representatives this year.

The AIAA Administrative Committee serves as a planning, organizing, and controlling body on behalf of the Executive Board. Membership is comprised of Billy W. Mayes, Sr., AIAA Immediate Past President; James E. Good, AIAA President-Elect; Willis E. Ray, AIAA President, Chairperson; and Donald L. Rathbun, AIAA Executive Director and Committee Secretary (ex officio) (Article VIII, Constitution and Bylaws).

One official meeting was held in the Washington, D. C. National Office on September 13-14-15, 1978. In addition, the president, president-elect, and secretary met in the National Office on two other separate occasions: May 10-11-12, 1978 and August 4-5-6, 1978. In addition, the president met with the secretary in the National Office on two other separate occasions: August 16-17, 1978 and January 17-18-19, 1979. Also, the total committee met for several sessions in Dallas, Texas at the AVA during the period December 1-2-3, 1978.

During this year, there have been three principal areas which have given focus to committee goals and priorities. These areas were (1) policy, (2) fiscal matters, and (3) professional standards. The Administrative Committee has been most effective in its efforts.

AIAA Committees

A great portion of the work of the Association is done by standing, operating, and ad hoc committees. This year over 300 members worked with 18 standing committees, 14 operating committees, and four ad hoc committees.

Under the stewardship of President-Elect James E. Good, the standing and operating committees have performed admirably. Immediate

Past President Billy W. Mayes, Sr. has provided similar leadership to three continuing ad hoc committees and one newly appointed ad hoc committee.

Based upon my observations over four years on the AIAA Executive Board (1972-74 and 1977-79), I have never seen such enthusiasm and effort exhibited by committees. Much work has been accomplished for and on behalf of the Association.

President-Elect Good, in addition to monitoring this year's committee activities, has produced an outstanding AIAA Committee Handbook 1979-80 which will guide committee operations for the next Association Year. He has been a task master of the highest order.

FY '80 Program of Work

If the Association has had a weakness, it has been in the degree to which it has been able to set forth and accomplish intermediate and long-range goals. Most planning, over the years, has been done for the short term.

Accepting this problem as a challenge and as a part of his platform, President-Elect James E. Good has worked with individual members, committees (especially the Mission and Goals Committee), the National Office, and the Executive Board to set up a system of long-range planning. As a direct result of his efforts, seven Association goals and 56 specific objectives have been set forth (for FY '80) to direct the energies of the membership next year and in the years to come.

The system of planning is far more important than any goal or objective. As members of the Association, we should become involved and assist in charting a steady course to attain the goals and objectives we desire.

Financial Support

This past year many long-standing life members responded positively to our request for help to build up our dwindling life member Reserve Fund. Also several dedicated regular members have made direct financial contributions. In addition, two commercial firms that do business with schools made direct, substantial donations. Such financial support has helped turn around the trend, over the past few years, of dipping into our financial reserves. The general dues increase has helped us simply to keep up with inflationary pressures.

Not to be overlooked is the broad, general support of our journal advertisers and our commercial exhibitors. Many companies assist the Association in our publications program and in holding our annual conference. On every occasion possible, Association members should let these friends know of our appreciation for their help. Learn as much about their products and services as you can, and make use of their wares as far as the budget will allow.

Concluding Statement

This year has been the highlight of my professional career. Dedicated people who exhibit a sense of pride and responsibility are in abundance in our profession. Persons who have served on committees and members of our National Office staff are the cream of the crop. I have especially enjoyed the close working relationships that have developed through our work together.

I have had the opportunity this year of meeting with several state associations and learning from them. There seems to be a feeling of optimism that we can, through group effort, solve the problems that face our profession.

Next year new leadership will continue to move our Association ahead. Lend your support to our new officers. Two classroom teachers (Les Litherland, President-Elect, Colorado and Kenneth W. Henderson, Vice President for Classroom Teachers (1), Colorado) will become members of the Executive Board. Also an industrial arts supervisor (James F. Snyder, Vice President for Supervisors, West Virginia) will join the Board. Under the superior leadership of our new President, James E. Good, New York, we should have an outstanding year of progress in 1979-80.

Thank you for allowing me to serve this year. It has been an experience I shall remember and cherish for years to come.

Willis E. Ray

Willis E. Ray
1978-79 President
The Ohio State University

Committee Chairpersons

ACCREDITATION, James O. Parnell
ADMINISTRATIVE, James E. Good
AFFILIATION, Gerald G. Lovedahl
AFFIRMATIVE ACTION, Denise H. Keller
ALLIED STUDENT PROGRAMS, Harold H. Bretz, Jr.
BALLOT COUNTING, Donald L. Rathbun
COLLEGE CLUBS (AIACSA), William E. West
CONFERENCE, Donald P. Lauda
CONTESTS AND SPECIAL EVENTS, Roy Hinrichs
CREDENTIALS, M. Roger Betts
CURRICULUM, Gary Lintereur
ENVIRONMENTAL EDUCATION, Doug L. Polette
HIGH SCHOOL CLUBS (AIASA), William P. Elrod
HISTORY AND ARCHIVES, Robert G. Hostetter
INTERNATIONAL RELATIONS, David L. DePue
LEGISLATIVE, Kendall N. Starkweather
LIAISON AIAA-IAD-AVA, C. Dale Lemons
MST EDITORIAL BOARD, Joseph F. Luetkemeyer
MEMBERSHIP, Thomas D. LaClair
METRIC, J. Russell Kruppa
MISSION AND GOALS, Donald G. Lux
NOMINATING, Frank J. Cackowski ('80), Jim Snyder ('81)
PAST PRESIDENTS, Billy W. Mayes, Sr.
PUBLICATIONS, Richard J. Vasek
PUBLIC AND PROFESSIONAL RELATIONS, Franklyn C. Ingram
RECRUITMENT, Donald F. Smith
RESEARCH, Raymond S. Lolla
RESOLUTIONS, Billy W. Mayes, Sr.
SAFETY, John Y. Stoudt
SPECIAL CITATIONS, Glenn E. Baker
SPECIAL SERVICES, Thomas Wright
TEACHER RECOGNITION, Kenneth W. Henderson

AIAA STATE REPRESENTATIVES

ALABAMA
Wiley Hartzog

ALASKA
Ray Minge

ARIZONA
Ernest T. Hirata

ARKANASA
V.N. Hukill

CALIFORNIA
Gary Grannis

COLORADO
Kenneth W. Henderson

CONNECTICUT
Werner Friese

DELAWARE
William R. Simpson

DISTRICT OF COLUMBIA
Hurley Fisher

FLORIDA
James W. McAlister

GEORGIA
Samuel L. Powell

HAWAII
Leroy Ching

IDAHO
Irving L. Stiber

ILLINOIS
Carl A. York

INDIANA
Frank Haynes

IOWA
Paul Franklin

KANSAS
Max Lundquest

KENTUCKY
Carl Kilborne

LOUISIANA
Thomas Landry

MAINE
Alden R. Colby

MARYLAND
Robert E. Sharp

MASSACHUSETTS
John LeClair

MICHIGAN
Virgil Graves

MINNESOTA
Donald A. Miller

MISSISSIPPI
Frank R. Trocki

MISSOURI
Dennis R. Mueller

MONTANA
James E. LaPorte

NEBRASKA
Hilary M. Konz

NEVADA
Jack Bobay

NEW HAMPSHIRE
Paul S. Cuetara

NEW JERSEY
Robert G. Thrower

NEW MEXICO
Frank Field

NEW YORK
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NORTH CAROLINA
William S. Scarborough

NORTH DAKOTA
Luvern R. Eickhoff

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C. Richard Lanier

OKLAHOMA
Earl G. Yarbrough

OREGON
Andrew J. Hoagland

PENNSYLVANIA
Philip Hublitz

PUERTO RICO
Nicasio Cruz

RHODE ISLAND
Paul P. Clark

SOUTH CAROLINA
Harvey E. Morgan

SOUTH DAKOTA
Marvin G. Burroughs and
Ken K. Gifford

TENNESSEE
W. Rollin Williams, III

TEXAS
Ronald Foy

UTAH
Ross Hilton

VERMONT
George H. Agnew

Virginia
Chester R. Lane

WASHINGTON
Raymond Glew

WEST VIRGINIA
Keeling Lewis Fife

WISCONSIN
Tom Baldwin

WYOMING
Charles Burke

CANADA
John Ross

SAN ANTONIO 1979
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Daniel L. Householder
PROGRAM CHAIRPERSON
Art Rosser
PUBLICITY
Jerry Drennan
Billy L. Windham
EXHIBITS
Neil Ballard
ARRANGEMENTS
Robert R. Hafernik
REGISTRATION
James A. Larimore
MEMBERSHIP
Ron Foy
COMMUNICATIONS
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SIGNS
Dean Heller
HOSTS/CHAIRPERSONS
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TOURS
Dan Jaime
INTERNATIONAL
Jerry W. Hedrick
SPOUSES' PROGRAM
Ann Householder
Caroline Rosser
SPECIAL INTEREST SESSIONS
Perry Suter
AUDIO-VISUAL
Burlen Horton
PLACEMENT SERVICE
Robert L. Habingreither
COLLEGE CLUBS
R. Gregory Nicholls
AIAA REGISTRATION OFFICER
Vance Snyder

AUTHOR INDEX

AUTHOR INDEX

A

Abbey, Marie
Andrews, Wayne
Angelo, Sandra Ann

B

Bachler, Michael R.
Baillargeon, Jarvis
Baker, George L.
Baker, Ronald E.
Baldwin, Thomas R.
Bame, E. Allen
Barella, Richard
Beachman, Herbert C.
Bell, Claude A.
Bender, Myron
Bensen, M. James
Berryhill, Harold
Bettis, Glenn
Boas, Edward E., Jr.
Boehner, Clagett
Bonfadini, John E.
Bradley, David
Breznay, Ernest
Brook, Robert D.
Brubaker, Nathan
Buffer, James J.
Byle, Arvon D.

C

Calder, Clarence R., Jr.
Campbell, Harry L.
Caron, Marc A.
Carter, Steve R.
Chowdhury, Aminur R.
Cliffe, Roger W.
Colle, Norman J.
Copeland, Leon L.

D

Darrow, Donald R.
Denning, Merle A.
DePue, David L.
DeVore, Paul W.
Dugger, William E., Jr.
Dyrenfurth, Michael J.

E

Ehlers, G. Leroy
Everett, J. Steven

F

Fales, James F.
Fairchild, D. Patterson
Fecik, John T.
Fite, James W.
Forkner, W. R.
Francis, C. E.
Fuglsby, Glen O.

G

Geil, John J.
Gore, David K.
Griffiths, L. Duane

H

Hales, James
Hahn, Marshall S.
Hans, Louis K.
Heggen, James R.
Henak, Richard
Henry, Marvin
Henson, Troy F.
Hess, Harry L.
Hinterberger, Ann Marie
Hoeksema, Jim
Hoots, William R., Jr.

J

James, Clyde "Jack", Jr.
Jones, Ronald E.

K

Kanagy, Max E
Kelly, Don
Knight, Robert W.
Koble, Ronald L.
Korwin, Anthony
Kozak, Michael R.

L

Lanik, Everett J.
LaRue, James P.
Lauda, Donald P.
Lemke, Lillian
Lintereur, Gary E.
Liu, Cheng C.
Loepp, Franzie
Lorenz, James
Loyd, Ray D.
Lundy, Lyndall L.

M

Martin, G. Eugene
Matt, Stephen R.
McCrory, David L.
Militzok, Douglas
Miller, F. Milton
Mockler, John
Mohan, David
Morgan, Kevin R.
Moyer, Dave
Musselwhite, W. Christopher

O

Olson, Chris M.

P

Paige, William D.
Parke, Nelson L.
Parnell, James O.
Pendered, Norman C.
Pershing, Rex W.
Perusek, Wesley
Petty, Gregory
Pierson, Michael J.
Pinder, Charles A.
Pine, Douglas T.
Preitz, Clarence H.
Pytlik, Edward C.

R

Richardson, Terry
Riddle, Hal
Rigby, William H.
Riley, John N.
Ritz, John M.
Robb, Janet L.
Rogstad, Mark
Runnalls, James J.

S

Sarapin, Marvin I.
Scanlin, Dennis M.
Schwaller, Anthony E.
Shackelford, Ray
Shearer, Robert L.
Shemick, John M.
Siegel, Herbert
Sinn, John W.
Skinner, Mark R.
Smalley, Lee H.
Snyder, James
Sredl, Henry J.
Starkweather, Kendall N.
Steele, Gerald L.
Story, Charles
Stoudt, John Y.
Streichler, Jerry D.
Surry, John
Swanson, Richard A.

T

Todd, Ronald

U

Umstattd, W. D.

V

Vaglia, John S.
Vogel, Michael

W

Waldrop, Phillip S.
Walgren, Floyd B.
Warrington, Robert
Weede, Garry D.
Wenig, Robert E.
White, Michael R.
Wisnewski, Jerome

Y

Yadon, James N.

American Industrial Arts Association

AIAA is the only national organization solely concerned with the development of industrial arts education. The Association devotes its entire resources to the interests of the profession.

AIAA speaks as the national voice of industrial arts and is the authoritative source for consultations with government and industry.

AIAA acts as the official liaison between industrial arts and other professional educational groups, both independently and through its affiliation with NEA.

AIAA serves as parent organization to the American Councils of Industrial Arts Teacher Education, Industrial Arts Supervisors, Elementary School Industrial Arts, and Industrial Arts State Association Officers, and also sponsors two nationwide networks of industrial arts clubs for students.

AIAA urges expanded industrial arts programs at all levels and stronger support from professional educators.

AIAA seeks to enhance the image of the profession by continuously stressing the highest teaching skills, professional standards, and innovation.

AIAA conducts specific programs to improve the industrial arts curriculum, increases the body of knowledge through sponsored research, sets standards for teaching, equipment, and techniques, and attracts talented students to the field.